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^# Processor speed 2.56K cache, 2.66GHz, 533MHz FSB

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^¤ Processor speed, 1MB L2 cache, 2.80GHz, 800MHz FSB

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IN THE LABS

154

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108

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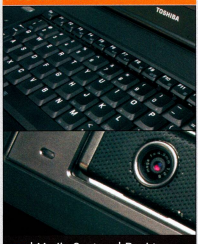
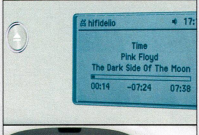


35 | Media Centres | Desktop replacements | Business machines | Home PCs

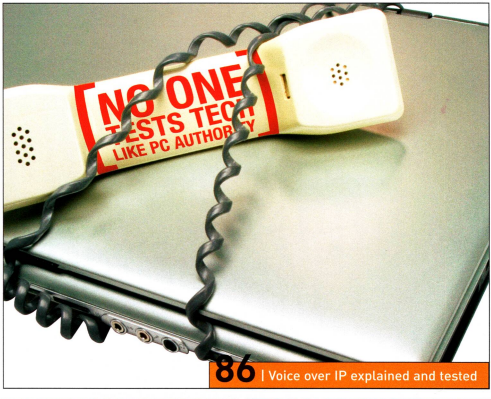
Peripherals



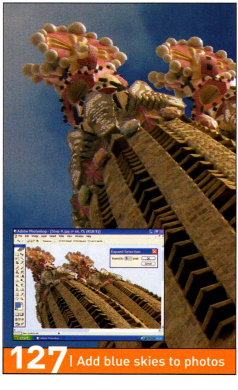
42 | TFTs | MP3 players | Speakers | Gadgets | PDAs Projectors | Phones

Software

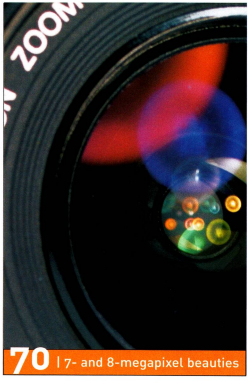
52 | Operating systems | Anti-virus | Security | Office | Photo editing | Freeware



86 | Voice over IP explained and tested

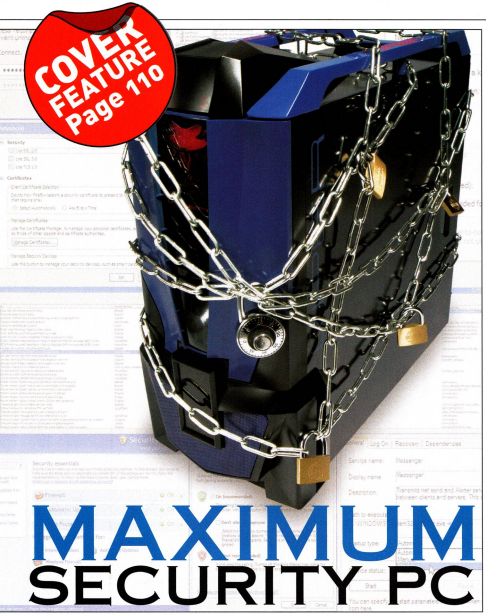


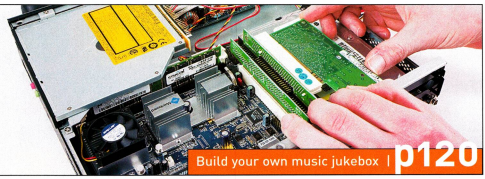
127 | Add blue skies to photos



70 | 7- and 8-megapixel beauties

AUSTRALIAN PC AUTHORITY THIS MONTH





TOP STORIES

MAXIMUM SECURITY PC COVER
Guide to locking down your machine to keep it and your files safe 110

DIY JUKEBOX HOW TO
Step-by-step guide to building your own PC music jukebox 120

IN THE LABS ROUNDUP

7- and 8-megapixel cameras
Take awesome photos without blowing out your budget 70

Voice over IP
Cheap phone calls, voicemail anywhere: VoIP is here 86

TECH SUPPORT HOW TO

Enhance your photos 127
Advanced Windows 131
Multimedia 134
Linux 136
Questions and answers 139
Moblogging 142
Instant messaging 143
Jargon Buster 144

GAMES NEW LOOK

City of Heroes 148
SWAT 4 149
Brothers in Arms: Road to Hill 30 150
Empire Earth 2 151
Stronghold 2 152
Doom 3: Resurrection of Evil 152

PLUS EVERY MONTH

Login 11
Horizons 12
Tech Horizons 20
Inbox 22
Investigator 24
A-List 27
Next month 156

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THIS MONTH'S TOP GEAR

▲ Page 36 Acer's top value Aspire 1691WLMI

▲ Page 38 HP's all singing, all dancing Instant Cinema.

▲ Page 41 BenQ's speedy 5ms LCD.

◀ Page 72 Samsung's feature-packed 7.1MP cam

LOGIN

Welcome to *PC Authority*'s biggest ever issue. We've had massive issues in the past, with add-ons, bundles, and extra CDs, but this month's 220 pages takes the gong.

It's not just quantity, either. Our guide to building a secure PC is a must read for anyone who has just bought or built a new system. Think of it as a handy checklist to make sure you're covering all the bases.

The Labs team has also gone over and above once more and delivered the definitive verdict on all things VoIP. We've looked at all the services, hardware and software out there and given you everything you need to know to upgrade.

The other piece of editorial you'll notice this month, is the whopping 64-page photography guide starting on *page 157*. Combined with Dan's superb round-up of 7- and 8-megapixel cameras, this issue is a true end-to-end guide.

'The Labs team has gone over and above once more and delivered the definitive verdict on all things VoIP'

I'd also like to extend my personal congratulations to Tim Dean who was recently awarded Best Technical Journalist at the Sun Microsystems IT Journalism Awards. Joining Tim were *PC Authority*'s own finalists, Darren Ellis, for Best Technical Journalist, Best Technology Reviewer and Best Games Journalist; Dan Chiappini for Best Technology Reviewer; and the magazine itself, for Best Editing/Sub-editing and Best Technical Magazine.

So, we hope you enjoy this monster issue of *PC Authority*. Just make sure you bend at the knees when you pick it up…

David Kidd, Editor
dkidd@pcauthority.com.au

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NEWS

Latest trends and products in the world of technology.

Better than life?

■ A new patent has been filed that will allow computer game users to literally plug their brain into a fantasy world, Matrix-style. Users would believe they can see, hear, smell and feel things. Wires into their head will fire ultrasound impulses to specific areas of the brain to create the illusion. Sony's patent stresses there is no actual invention as such yet but it is laying claim to the theoretical idea.

Games online

■ Online gaming just took on a whole new meaning with Telstra's launch of GameNow. For a monthly subscription you can download the games of your choice at will – and all legally. New streaming technology means you start playing before the game has even finished downloading.

Email unlimited

■ Google has doubled the limits on its email mailboxes to 2 gigs – and promises it won't end there. The company plans to keep increasing until it is effectively infinite.

HITACHI

Hard disks up-ended

■ Hard drives have hit the one terabyte mark with Hitachi's new approach. Instead of horizontally recording data, Hitachi has gone vertical and doubled HD capacity. They are expected to arrive in 2007

Sony's iMovies hope could end TV as we know it

Moving swiftly where the music industry stubbornly dragged its feet, Sony has made the first step towards really revolutionising home entertainment. Forget DVDs, free to air, cable and even digital TV as you know it.

The ability to take control of what you watch and when is the future. TV pirates are already doing it by downloading episodes of their favourite shows and movies off the net and effectively making their own TV schedules, unhindered by adverts or TV bosses' ideas of what they should be watching.

Now Sony is taking the first step towards cashing in on the concept by proposing an iMovies version of iTunes, but for films. It wants to legitimise the massive trade in the latest flicks on the net by allowing people to download top quality copies quickly for a set fee.

'We want to set business models, pricing models, distribution models like [Apple Computer CEO Steve] Jobs did for music, but for the film industry'
Sony Pictures vice president Michael Arrieta

It's only a small step to integrate all the latest episodes of top TV shows into the bundle. And there is a huge demand for it. Currently, illegal downloads of TV shows, films, music and software is said to make up 40 percent of all internet traffic. But since its launch, iTunes has been a huge success, tapping into the MP3 market created by the pirates but which is now earning the record industry millions.

If launched, an iMovies app could spark a battle between traditional broadcasters and the download distributors. Will punters pay for an online film or an ad-free version of a show weeks before it's shown locally? It would be a fool who bets against it.

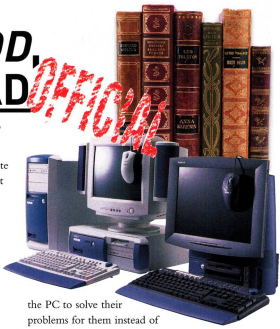
See page 21 for more on TV's future.

'I'm trying to create the new anti-Napster'

Let's hope Sony VP Michael Arrieta's vision includes Australia – unlike the as-yet Oz-unfriendly iTunes.

BOOKS *GOOD*, PCs ARE BAD

New research suggests PCs don't make smarter kids.



Computers are making our kids dumb. Despite all the industry and political hype of the last 25 years, a study of 100,000 kids in 31 countries around the world has found that PCs simply don't help children learn better.

And according to the report by the Royal Economic Society in the UK, computers actually hold youngsters back. They found kids with a PC at home were actually poorer students than those without any digital assistance.

Despite all the learning aids and multimedia encyclopedias, the research team from Munich University found PC skills were no more use than being able to work a telephone.

But children from families with 500 books in the house were consistently better students than their wired-in schoolmates. Literacy and numeracy rates soared when there were no PCs involved in the children's education.

The study found kids had become dependent on the PC to solve their problems for them instead of analysing something and working it out for themselves. Children's imagination was also being stifled by the digital age.

The researchers also concluded the PC was a major distraction from doing homework, with games usually taking precedence over school work.

'Holding other family characteristics constant, students perform significantly worse if they have computers at home,' the study insists.

HACKER JARGON BAFFLES USERS

More than eight out of ten average computer users don't know what some of the jargon means that describes hackers' attempts to take over their PC.

The new AOL study *Do You Speak Geek?* has found the public hasn't kept pace with the language used to warn them of the dangers online.

A staggering 16 percent didn't know what spam was, while 84 percent couldn't explain phishing.

'If internet users can't understand the language used to describe these risks, they are going to find it hard to protect themselves from being ripped off,' said Will Smith, AOL's security expert.

Know your geek speak?

Take this test to find out. What do the following mean? Match the terms to the definitions – answers below.

1) Spyware 2) Trojan 3) Keylogging 4) Pharming 5) Phishing 6) Rogue dialler 7) Firewall 8) Virus

A: Software that installs itself and changes settings to dial a premium rate number instead of the usual dial-up account.	**E:** Malicious program designed to damage data; usually spread via infected email attachments.
B: Software or hardware to protect computers against hackers.	**F:** Small programs that violate your privacy by secretly monitoring sites visited.
C: When fraudsters redirect net users from legitimate to fake sites.	**G:** Malicious software disguised as a harmless program.
D: Software or hardware to track keystrokes on a PC to gather passwords or credit card numbers.	**H:** Fraudulent emails and pop-ups to fool you into revealing personal information for criminal gain.

Answers: 1. F| 2. G| 3. D| 4. C| 5. H| 6. A| 7. B| 8. E|

'Some terms are more suitable for programmers'

AOL's Will Smith discovers AOL users are not the brightest bunch.

Target Symbian

■ The hacker crowd has finally targeted smartphones with a vengeance. Symbian 60 models now have at least three viruses out in the wild using sneaky techniques to infect and disable phones. One installs a corrupt font, another hides in MMS messages and another can come via Bluetooth. A complete reformat is the only cure so far.

Photons on stun

■ Light speed computing is on its way. Luxtera has announced an optical modulator running at 10GHz, putting Intel's own 1GHz model in the shade. Using light instead of copper wire for chip to chip communications cuts power and heat while increasing internal bandwidth. The price will almost certainly be extortionate so don't expect it on your desktop in the next 10 years.

MS kill the Messenger beta

■ MSN Messenger 7.0 has finally gone gold after a protracted beta. It now allows you to nudge your friends into a response and send winks. Watch when setting up though as it is bundled with MSN junk.

Cherry pipped

■ CherryOS has gone from last month's launch to 'on hold' to an open source project. It lets you run Mac OS X on your PC, but there are claims it lifted a rival's code.

Update alert

■ A new phishing scam has an email going out claiming to be from Microsoft with a link taking users to a fake Win XP Update site. Instead of a patch though, the site installs a malicious trojan, giving hackers a backdoor to the PC.

Aussie spam shame

■ Australia is in the world's top twelve worst offenders for sending out spam. A new survey shows Oz is 11th in the league of spam-orginating countries headed by the US with South Korea and China in second and third places.

Cheeky txters

■ Carsales.com.au was hit with a $6500 fine by the Australian Communications Authority (ACA) for texting spam to customers whose mobile phone numbers it had harvested from its webpages.

Spammer raid

■ An unnamed company in Perth was raided by the ACA over claims it had sent out tens of millions of spam emails. The move marks a stepping up of the ACA's anti-spam campaign from simple warnings to serious legal action.

Fake blogs spread viruses

■ An estimated 200 sites use spam to direct unsuspecting users to their fake blogs, which then install keyloggers on a user's system.

CHIPPING NEWS

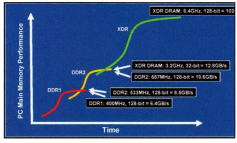
RAMBUS RETURNS

New life for the company that brought us RD-RAM? Bennett Ring looks the next generation memory.

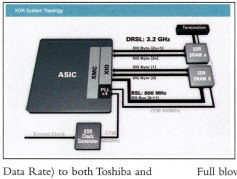
Just when you thought your DDR2 memory was blazingly fast due to its 533MHz speed, along comes a new type of memory that makes it look positively sluggish. You might remember a little company by the name of Rambus, who released an overpriced memory format known as RD-RAM when the Pentium 4 was first introduced. Well, this company didn't just disappear when the Pentium 4 migrated to DDR-RAM and left RD-RAM users crying into their empty wallets. It has recently licensed a type of memory interface known as XDR (Extreme Data Rate) to both Toshiba and Elpida Memory Incorporated.

The resulting XDR-DRAM products announced by both of these manufacturers ticks by at the dizzying speed of 3.2GHz, giving it a total data bandwidth of 6.4GB per second per memory channel. Toshiba's version of this memory is already sampling, and has been tested to a maximum data rate of 4.8GHz.

▼ XDR-DRAM runs at a blistering 3.2GHz speed with a 6.2GB per second throughput.



The actual DRAM modules in use on XDR-DRAM isn't greatly different to DDR-DRAM. The main variation is in the interface between the memory controller and XDR chips. The 3.2GHz part actually runs at a raw clock speed of 400MHz, but gains its massive speed boost due to its ability to transfer 8 bits per clock cycle, compared to the 2 bits per cycle that DDR DRAM is capable of.



Full blown manufacturing of XDR RAM isn't too far off, although it will be aimed primarily at high end uses such as digital TV, graphics cards and next generation gaming consoles, before eventually trickling down to the desktop PC.

ULTRA FAST SLO-MO

We're not sure who would ever need a camera that runs this fast, but Shimadzu has just released a camera that is able to capture footage at a blindingly fast one million frames per second. It might be great for capturing footage of gravity waves bending lasers, but there's probably no need for this kind of technology to be implemented in digital handicams.

The fact that the HyperVision HPV-1 is only capable of capturing monochrome images that are 312 x 260 pixels in size probably makes it unsuitable for your next family wedding as well.

These images are stored on the camera's 20GB hard drive in AVI, TIFF or BMP format, so it would probably max out the storage space in approximately 0.003 seconds – not even long enough to capture the shot of the groom sliding the ring on to his blushing bride's finger. There's also the high asking price which makes it unsuitable for amateur film makers – at US$205,000 this is certainly a niche product.

'The US is responsible for one-third of the world's spam'

Sophos security analyst Gregg Mastoras has seen more Viagra ads than any man ever should.

5 MOST WANTED

This month's hottest gizmos.

1 South Korea has announced it is developing robot soldiers to patrol the border with North Korea. We're not making this up. They reckon they'll have them running within 10 years. Wonder if they'll have Bluetooth? Or run on Windows?

2 Who can resist a tiny shiny thing? The new Nokia top of the range 8800 has it all – smartphone, camera, video, MP3 player, Bluetooth – all wrapped up in polished stainless steel and it *pops up out of its holder*! That one feature alone may guarantee its success with the masses.

3 It's a bionic man kit! And it doesn't cost $6 million! It does however cost about $25,000 so it's still not cheap, but it lets you pick up and carry about 40kg more than you normally can. It's designed for the elderly or disabled, but we want one now please.

4 Talking of tiny shiny things – check this out. Said to be the upcoming new PalmOne Lifedrive PDA, it allegedly boasts a 4GB hard drive and other tasty enhancements in a completely redesigned box. Yum.

5 It's all robots this and robots that this month. Jacques Cousteau's son has built a robot shark. We're not making this up either. It looks and behaves just like a Great White Shark, he says, and can give him a better insight into how they live. Sadly, he chose the camera option over the laser one. Robot sharks with lasers, that's the future.

LAPTOPS CHARGING AHEAD

From empty to almost full in a minute.

While our portable computing devices continue their remarkable performance evolution, they're still limited by one key component – the power source. Battery technology doesn't appear to be evolving at the same rate as the rest of the components within these mobile devices, but a recent announcement by Toshiba shows that better batteries aren't far off.

Known as the Super Charge Battery, the remarkable feature of this Lithium-Ion battery is the fact that it recharges sixty times faster than the Lithium-Ion batteries currently in use. It can reach 80 percent of its overall capacity in a mere minute, making lengthy recharge times a thing of the past. A breakthrough in nano-material technology is the key factor in this innovation.

Not only does the battery recharge at a much faster rate than today's power sources, it doesn't suffer from the rapid degradation in capacity that today's Lithium-Ion batteries are prone to after repeated charge cycles. Even after 1000 full charge and discharges, only a mere 1 percent of the overall capacity is lost.

The prototype version of the battery measures 3.8 x 62 x 35mm and has a capacity of 600mAh, making it suitable for devices as small as a mobile phone. It's also suitable for use in extremes of temperatures, operating with great efficiency from the depths of -40C up to a steamy 45C.

The first deployment of this technology will arrive in 2006, but we'll have to wait for it to graduate beyond its initial automotive and industrial applications. When it does hit your nearest portable gadget, rest assured that recharging stations in public places will probably become as ubiquitous as ATMs.

'We rarely disagree with what the program has said.'

But if Professor Edward Brent did, would his electro-tutor Qualrus give him detention?

ice GUIDE

EPG for PVR at last

■ In a frenzy of TLAs (Three Letter Acronyms) IceTV has launched Australia's first Electronic Program Guide (EPG) for Personal Video Recorders (PVR). This has been the missing key ingredient for digital recording Down Under. Now one click on a remote can set up recording schedules. It costs from $3 a week to subscribe or bundled free for a year with their own twin-tuner PVR, priced $1099.

Electro-tutor

■ Exam papers are being marked by computer in a radical new US experiment. Qualrus, developed by the University of Missouri, can analyse word patterns, based on a tutor's teachings and other student papers, and then judge and score an idea's viability in just a few seconds. Developers say the tool could save hundreds of hours of teachers' time.

Emailer e-jailed

■ The US has jailed a man for nine years for sending out spam. Jeremy Jaynes, 31, was sending out up to 10 million emails a day and earning a million bucks a month. Jaynes thinks nine years is a bit much, and he is appealing the decision.

Let me through, I'm a printer...

■ UK scientists are developing a printer that will spray human cells through inkjet nozzles onto a patient. They hope to speed up the healing process by spraying seed cells to the exact size and shape needed for skin grafts.

How to save your cookie and delete it

■ Those pop up ads guys just get sneakier and sneakier. United Virtualities has found a way to restore cookies deleted by antispyware programs by hooking into a profile stored in Flash animations. Macromedia has a page on its website showing how to defeat the ad-baddies.

Optus 'Yes' to Reef

■ Optus has bought out Queensland fibre optic cable network Reef in a deal worth $93 million.

Virus attacks up

■ 2004 saw virus attacks increase by a whopping 50 percent over the previous year. Companies surveyed by Cybertrust had four out of ten PCs facing infection every month.

iSpoilsports

■ The competition to write a Mac virus has been called off. A US firm had offered $30,000 to anyone who could infect two internet Macs running OS X straight out of the box. It was intended to counter claims that Mac viruses were on the rise by showing there was zero chance of Macs being infected. But experts told the sponsors DVForge, that while the chances were extremely slim, they were not zero – and the virus quest was abandoned.

ACS VIEW

BIG BROTHER'S NEW TOY

Is GPS the way of the future? Edward Mandla protects his privacy from the eye in the sky.

Global Positioning System (GPS) technologies are expected to boom over the next couple of years, but there are massive implications for users that are only now getting some attention.

For example, let's say you have to attend a meeting somewhere in the city that you have never been before. What might once have been a challenge, in the future, your mobile phone equipped with GPS mapping technology will guide you effortlessly to your destination. Or say you're about to leave the office and you remember it's your wife's birthday. On the verge of panic, you type into your GPA-equipped mobile phone, 'wife. present. help. trouble.' and you're guided to the nearest open store.

GPS mapping uses satellites orbiting the earth, control and monitoring stations run by the Department of Defence, and GPS signal receivers, which are increasingly being built into cars, mobile phones, PDAs and more. By cross-referencing signals from four satellites, a standard GPS receiver can pinpoint a user's location to within 20 metres, although this is normally downgraded to 100 metres, due to selective availability of satellites.

So while the advantages of GPS mapping technologies are appealing, so too are the pitfalls, since these technologies also make it much easier to track, monitor and stalk people.

Already, the privacy issues are being debated after a number of arrests in the United States of people who has used GPS for stalking. A 32-year-old California man was charged last September after attaching a mobile phone and GPS device to his ex-girlfriend's car to track her whereabouts. She was surprised that he kept turning up wherever she was.

Some employers have begun incorporating GPS technologies into their businesses, particularly in transport and distribution, since it means they can monitor a driver's location at any point in time. They can also identify the route being taken, where and when they stop, and how long the trip takes, supposedly increasing efficiency and customer service.

But here's where we step into the grey area of privacy and the ever watchful eye of Big Brother. Continuing in the example above, employers should avoid potential legal problems, such as not monitoring employees' whereabouts before and after work or during lunch. It's all too easy for a courier company to start tracking drivers to ensure they aren't wasting time on individual deliveries. If a courier knows they face disciplinary action for taking too long, they might start taking risks to shorten their delivery times. And if these risks lead to an accident, the company might be liable if it can be shown that the monitoring was an influential factor.

The Occupational Health and Safety Act 2000 is based on the principle of Duty of Care and covers all workplaces in NSW except mines. Employers need to evaluate that the use of GPS monitoring does not breach this duty of care.

GPS technologies are expected to provide many benefits; however employers need to fully assess the use of these technologies within the workplace in order to avoid any potential problems. On the legislative side, governments must also ensure that GPS mapping technologies do not infringe upon an individual's right to privacy. Only then will GPS ride that fine line as a business platform and personal tool, without crossing into Big Brother's arsenal.

Edward Mandla is national president of the Australian Computer Society

'Linux servers make great hosts for Windows desktop sessions.'

Will Win4Lin CEO Jim Curtin's words strike a chill in Bill Gates's bones? Probably not.

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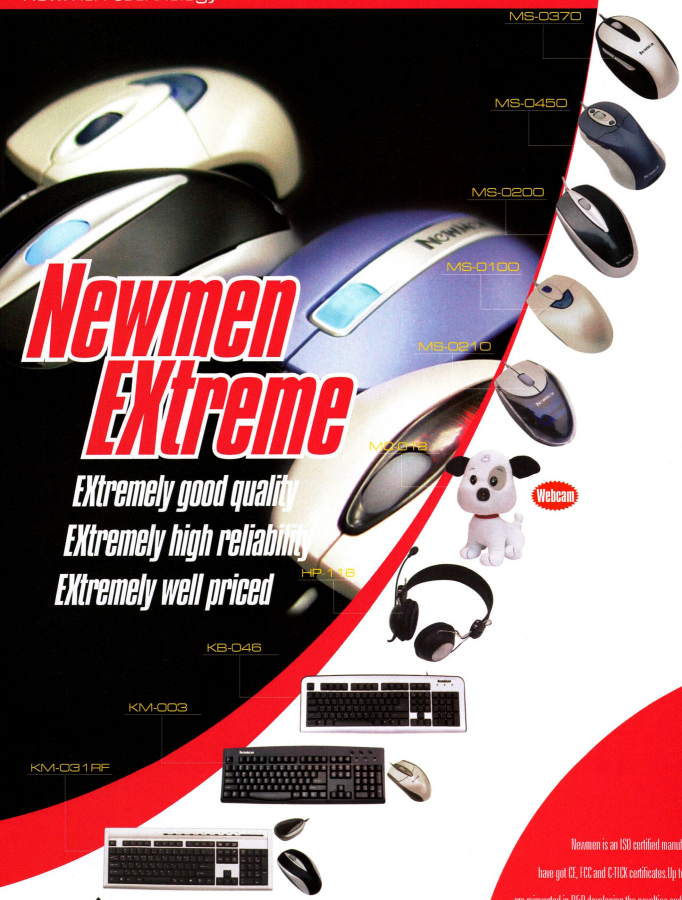

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TECHNOLOG

MORE IS LESS?

Tim Dean is watching too much TV.

The concept of the 'tyranny of choice' is not a new one. It's been a well-studied phenomenon ever since the 1970s, after the number of brands in our supermarkets increased from a few of each product to several, and then to dozens. Give consumers a choice of six jams, and they'll be more likely to make a purchase than if you confront them with 24 varieties, at least according to Iyengar and Lepper (2000).

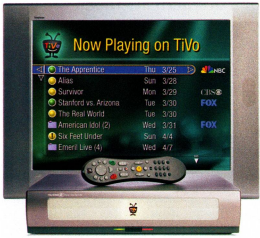
The application of the tyranny of choice to television is also nothing new. The Boss (although that's an arbitrary moniker) gave us 57 Channels (And Nothin' On). Well, things are about to get a whole lot worse.

In the next decade or so, television will change in a radical way that we're only now just beginning to comprehend. Not only is television moving to digital, but it's also starting to get chummy with IP networks.

Interesting things are already happening, such as net savvy viewers in Australia and the UK downloading newly released episodes of the latest US TV series, and watching them several weeks before they're broadcast locally.

The big change, however, will come when the big studios decide there's money to be made in opening up their vast archives of TV shows to the consuming public. Imagine how many episodes of Gilligan's Island, Happy Days, The Love Boat, and Miami Vice there are just gagging to be re-watched?

Then there's an interesting development happening over in the UK that may well be a sign of things to come. A high tech company, Atzio, is offering a new distribution system to television networks that is based around tried and tested peer-to-peer file sharing.



The idea is each subscriber has a set top box hooked up to broadband, and these all link together to make a massive peer-to-peer network running a protocol similar to Bit Torrent.

When your set top box requests a show, it doesn't download it from a single overloaded server, it sends a request over the whole network. Then any other set top boxes with the content, and some spare bandwidth, start feeding it down the line. The consequence of this system is that the more demand there is for a programme, the easier it is to get, as there are more boxes serving it.

Now, put all these things together, and suddenly we could be in a position of switching on our telly and instead of having the tyranny of 57 channels to choose from, we could have literally tens of thousands.

The end result of this situation would be a wide spread consumer paralysis, at least after the initial feeding frenzy, which would probably only last a couple of months before we run out of steam. One of the big issues is how to introduce new content to this system? At the moment we have a fixed number of channels that choose and push content to us, but as this system dissolves into user-generated programming, we're going to have to go out and find content instead of relying on it come to us.

There are a few interesting solutions to this anticipated problem that are already arising. One is a TiVo-style recommendation system, where your viewing habits will be analysed and your set top box will make viewing suggestions for you. Another solution could be in the form of large online communities of viewers with like tastes who can then make recommendations to each other.

What the television landscape looks like in ten years time is still very speculative, but whatever happens, things are sure to change more in the next decade than they have in the last 30 years.

'In the next decade television will change in a radical way we are only just starting to comprehend.'

But you can bet John Woods will still be in Blue Heelers – and still won't have won a Gold Logie.

Bye bye Bluetooth

■ Many have predicted that Bluetooth's days could be numbered in the coming years. MIT has announced a five year industry partnership to find a better way for PCs, laptop, handhelds, mobiles and peripherals to commmunicate. In other words, to do everything that Bluetooth should be doing.

Big boys' toys

■ Men spend more on computer games than music – and gamers are getting older, with one in four now aged 40 or more. The US survey found the average gamer spends five hours a week playing alone and another three hours playing with friends or family.

Hacker School

■ Spain has opened the first academy of hacking (Hackademy? No? Ah well, suit yourself...). Rather than teach kids how to hack though, it teaches them how to protect themselves online by explaing how hackers operate. It was set up at University of La Salle by The Institute for Security and Open Methodologies in Barcelona.

Print hits back

■ Newspapers are fighting back against news sites like Google and Yahoo! In a bid to cash in on internet readers, the *LA Times* and *The Guardian* are among those launching their own easy access RSS feeds for readers to integrate ads and easy access even for beginners.

CLASH OF THE TITANS

They might look like games consoles, but the next generation Xbox and Playstation are actually much more. Tim Dean investigates.

Sony and Microsoft have had horns firmly locked in the console arena since the launch of the Xbox. The fallout from this titanic battle has resulted in some collateral damage, in the form of Sega dropping out of the race all together, and the once mighty Nintendo being relegated to a distant third place.

However, neither Sony nor Microsoft are any stronger because of their joint dominance of the console market. Both are under immense pressure to find not only sales but profit in this domain. If either of their next generation platforms fails to gain traction in the market, it will very likely spell the end the line, at least for their console business.

Both companies are now going in quite different directions with their next generation consoles. On the surface, and in their press releases, they're still machines for playing games, but there's a much bigger agenda just below the surface – the creation of the ultimate home entertainment system.

'The move from one hardware platform to another is a fairly striking move in an industry where the adage is "software sells hardware"'.

MICROSOFT'S VISION

The original Xbox was a unique development in the console market from the outset. Unlike previous generations from the likes of Sega, Nintendo and Sony, the Xbox was essentially a PC tailored for playing games. As such, Microsoft was able to bring its considerable expertise in software development to the Xbox while avoiding the cost and complexity of a traditional Windows PC for the end user.

The next generation from Microsoft may take this hybrid philosophy even further – to the extent that it might even threaten the role of the home PC all together. Before we look at how the next gen Xbox (we'll call it Xbox 2 for brevity's sake) will fit into the digital home, it's worth taking a peek under the lid to see what's new.

Not much has been officially announced by Microsoft about the architecture of the next Xbox, but we do know a couple of facts. First, Microsoft has signed deals with IBM and ATI for the CPU and GPU respectively, which is a massive shift from the Intel/NVIDIA platform of the original Xbox. We also know Microsoft is doing a lot of work on the software side to have the underlying OS take care of things like music, voice and networking so games developers can focus just on the game code. Another interesting move is to incorporate an online marketplace, where users can browse and download content directly to their Xbox, along with online microtransactions. Finally, Microsoft has strongly emphasised the role that high definition will play in the future of gaming and home entertainment, so it's safe to assume the Xbox will output in HD.

Now, on to the speculation. The move from one hardware platform to another is a fairly striking move in an industry where the adage is 'software sells hardware'.

The Playstation 2 gained a tremendous leg up thanks to its compatibility with original Playstation games, and it's believed the Playstation 3 will continue this legacy, even with its new processor architecture.

However, it's not known for sure whether the Xbox 2 *won't* be compatible with the Xbox, and it's not beyond reason to see some sort of software emulation included to give it backwards compatibility. Remember, Microsoft acquired Virtual PC from Connectix in 2003, and this gives the Mac platform the ability to run PC software. If IBM is supplying the CPU, then there's a good chance it'll be based on either the POWER4, or more likely the POWER5. If so, it's quite reasonable to assume that Virtual PC could be woggled to give the Xbox 2 the ability to emulate the x86 environment of the original Xbox.

As for the processor itself, it's not yet confirmed whether it'll be based on the POWER4 or POWER5 architecture, although it's more likely to be the latter rather than the former. There's talk of it sporting two or even three cores, running at 3.5GHz or more, with a shared 1MB L2 cache between them. Xbox 2 development kits have also been distributed on dual processor G5 Macs with a custom NT kernel, which reinforces the theory of a dual core POWER-based system. Whatever it is, it's sure to be significantly more powerful than the Pentium 3 in the original Xbox.

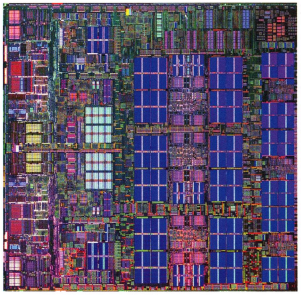
It's also known that Microsoft has conducted a number of focus group studies in the US looking at what kinds of devices people would like in their home. The interesting thing about these studies is they posited three alternative Xboxes: one was an inexpensive unit without a hard disk; another was much like the current Xbox, with a built in hard disk; and finally there

IN RETROSPECT

The Intellivision is one of *PC Authority*'s favourite snippets of video gaming history. It kicked off with a bang in 1980, selling 850,000 units by the end of 1981 even though it cost twice as much as the dominating Atari 2600.

It was originally pitched as an all round home entertainment and educational tool, and the core console was to become the heart of a computing system, complete with keyboard. Unfortunately, the all-in-one dream of the Intellivision didn't eventuate, and competing consoles, like the ColecoVision, NES and the Commodore series, pushed the Intellivision off the market.

With Microsoft and Sony's focus on building all-in-one entertainment systems we can't help but think back to the Intellivision. Fortunately, Intellivision games are back in various software bundles for existing consoles and direct-to-TV units. Head to www.intellivisionlives.com.



▲ Xbox 2's processor may be based around IBM's advanced POWER5 architecture.

was basically a full PC, with Windows support, keyboard and mouse, DVD burner etc, that also ran Xbox games. Another little titbit was the possibility the Xbox 2 could sport a removable hard drive which itself would double as an iPod-type MP3 player. Intriguing.

It's quite likely that none of the devices from the studies are locked in stone, but it's interesting to know that Microsoft has been exploring these options. This, along with the inclusion of high definition, the online marketplace and microtransactions raises an interesting theory: that games are not really the main focus of the Xbox 2, but digital home entertainment is.

It's not hard to see the Xbox 2 being a combination games console, HDTV receiver, personal video recorder, and conduit for online content – basically a Media Center done right.

If you're browsing and downloading online game content over broadband, why not music and video as well? Also, if you're packing a high definition capable television, then internet browsing and other Windows apps are also quite feasible.

SONY'S SCHOOL OF THOUGHT

Facing off against the Xbox 2 is Sony's next generation Playstation. Sony has taken a more conventional approach with the Playstation 3, and it appears to be primarily geared as a games console, although there's certainly a hint that Sony also wants it to be the hub of a digital home entertainment device.

The main difference is the uncertainty over whether the Playstation 3 will have a hard disk included. There's a good chance that like the Xbox 2, the Playstation 3 will also be sold in multiple variants depending on the level of features you want, and one of these will pack a hard disk.

The other interesting thing about the Playstation 3 is its CPU. It's going to be based around the new Cell technology, jointly developed by IBM, Sony and Toshiba, and manufactured by IBM. Cell is a fascinating architecture that will be the subject of an upcoming expose on these pages. Essentially, it does away with the old one size fits all approach of most contemporary CPUs and uses a kind of grid computing philosophy.

The theory is that each individual component is relatively simple and specialised, with most of the complexity handled in software. A Cell computer will have multiple processors, each with multiple individual cores, that can be dynamically assigned to threads as needed. Processing power can also be shared over a packet switching network, such as over TCP/IP. In theory, you could have a dozen devices in your home with Cell processors, some with just one, some with more, and they could all work together to share the common load.

Sony's choice of the Cell processor is certainly an ambitious move. The Playstation 2 was already renowned as being a difficult platform to develop for, especially compared to the relative simplicity of DirectX on the Xbox. Programming for the Cell will be even more complicated, as the code needs to work at a lower level than with a relatively developer-friendly API like DirectX.

Still, if Cell works out, Sony could well leap frog its contemporaries and kick off a bold new vision in home computing.

THE REAL WINNER

At the end of the day, the end users will be the winners in this battle. Oh, and IBM. Big Blue has scored somewhat of a coup in the processor manufacturing industry over the last 18 months. IBM is now making processors for AMD, Apple, Nintendo, Sony and Microsoft. That's just about the whole consumer sphere except common desktop and notebook PCs.

The most interesting thing to watch out for will be the subtle shift in message put out by Sony and Microsoft. At the moment, the Xbox 2 and Playstation 3 are promoted as games consoles, and most of the press coverage and buzz concerning them is coming from traditional console gaming circles. However, it would not be unexpected to see Microsoft and Sony begin to emphasise the broad home entertainment aspects of their consoles, and that could change things entirely. ■

CONSOLES THROUGH TIME

1971 First commercial console, Odyssey, released
1972 Pong game created
1977 Atari 2600 console released
1979 Atari releases Asteroids
1980 Mattel releases the Intellivision
1981 Mario first appears in Donkey Kong
1986 Nintendo Entertainment System (NES) released
1986 SEGA Master System released
1989 Nintendo releases Game Boy hand held
1989 SEGA releases Genesis system
1989 Atari releases Lynx hand held system
1992 SEGA CD console released
1993 Atari releases Jaguar console
1994 SEGA releases the Saturn console
1994 Sony releases the first PlayStation
1996 Nintendo 64 console released
1999 SEGA releases the Dreamcast
2000 Sony releases the PlayStation 2
2001 Nintendo releases the GameCube
2001 Nintendo also releases the Game Boy Advance
2001 Microsoft enters console market with the Xbox
2004 Nintendo releases the Game Boy DS
2005 Sony releases PSP hand held
2005 PlayStation 3 and Xbox 2 expected for Christmas

WHAT DO YOU THINK?

Was this article helpful? Let us know at: **feedback@pcauthority.com.au**

INBOX

Got something to say? If you have a good story, an amusing anecdote or a tale of woe, we want to hear it!

MARKETING PLOY

It seems to me that *PC Authority* is falling for the marketing ploy of bundling extras to make the product seem more worthy. For example, from the PCX graphics card review for the AOpen Aeolus 6600GT: 'its real world testing results were second to none, sweeping the pool to take first place in each of the four tests ..... Overall, it's a great performer with a reasonable price, but there are better bundles in the Labs this month'. Hello! The card placed first in every test against its direct competitors and couldn't even get a recommended award, what are you testing? The product or what comes with it?

I am not upset, but if I am looking for my next graphics card, performance is the key, what comes with it hardly matters. I agree that extras such as converters and cables make a big difference to the product experience, but rating one product better than another should only be based on the accessories that come with it if all other areas are equal. In the case of the AOpen Aeolus 6600GT, it has no equal among the 6600 cards on performance and should have at least earned a recommended flag.

B Donaldson

Ty Pendlebury replies:

Yes, the Aeolus did exceptionally well – it's an excellent card. But in comparison to the other 6600GT cards it performed very similarly, winning some benchmarks by less than a tenth of a second. In this case, when the field is so close, there is nothing else to distinguish the card apart from its price and its bundle – and there were cards in the field that were better in this regard. If, however, you are solely after the very fastest card, then you'll find all the details you need in the comparison.

TRESPASSERS WILL BE SHOT?

In his article entitled Prevention is Bad for Business (Technolog, *May 2005, page 24*), did Tim Dean really mean to write that it should be the responsibility of government to do as much as it can to prevent crime and *persecute* offenders? If so, then I heartily concur. Mere prosecution is *much* less satisfying.

F Zabkar

WORLD OF PAIN

I thought I would drop you a line and tell you about my experience with World of Warcraft. Every story I have read has stated how *fantastic* the game is – no story has ever been critical of the game. The game itself is brilliant, there is no disputing that. However, Blizzard's total lack of basic business sense has made a great game a nightmare for the majority of its subscribers. Constant problems with the servers, down time, corruption issues – all of these things destroy any enjoyment that one derives from the game. Take a look at the WoW forums for the number of complaints as confirmation of all the problems. Blizzards constant lines 'we are currently working hard to fix the problem' and 'your patience in this matter is appreciated', are *really* wearing thin. So please do your subscribers a favour and warn them of what they are in for if they decide to subscribe to WoW. For a game that is advertised as being available 24/7, it fails to deliver and the statement appears to be fraudulent and misleading.

A Larin

Dan Chiappini replies:

This is a great point, especially with online games that are dependent on external factors. There have been a lot of problems with the WoW servers of late, for more information turn to page 147.

MICROSOFT VOIP?

Like most of us, I have been eagerly awaiting a VoIP phone kit that would be worth having. Each time one comes along it seems the bottom line is that if the people you want to contact don't have the same system you end up paying pretty much the same kind of

STAR LETTER: FLASH FIGHT

I just read your 'Laser wars' article (Tech Horizons, *May 2005, page 22*), and I've noted that both Australia and the UK have been using blue-ray recorders for some time. However, I would rather buy flash-based technology, and believe it is about time manufacturers look at a medium that doesn't scratch or suffer all the setbacks that DVD has.

Flash disks are fast decreasing in price and increasing in size. Why can't we have movies on this technology? They would be far easier to manufacture and handle, and there are already flash players on the market which are stable and support the MPEG standards. It wouldn't take much to upgrade their firmware for new codecs that become available and they already have prototyped 28GB cards in the States.

Ben

HARMAN KARDON'S SOUNDSTICKS II

Thanks to DVDirect, this month's Star Letter takes home Harman Kardon's SoundSticks II. Worth $299, they comprise two 10-watt satellite speakers backed by a 20-watt subwoofer, which produces a bass response down to 44Hz. Visit www.dvdirect.com.au or call (02) 94526001 for more information.

money as if you rang them on a normal phone line with a good deal. Not to mention phone cards!

The obvious answer is that Microsoft could set a defacto standard and make themselves a pile by releasing their own VoIP kit. Support in the next OS? Some time back this illustrious publication suggested Microsoft needed a new killer app. Here it is. They

are the only ones with the marketing clout to be able to get critical mass with a system.

How can we lobby them to get in to gear?

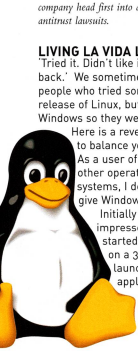
C Griffiths

David Kidd replies:

We agree that Microsoft needs a new killer app, and in fact MSN Messenger does have an integrated VoIP feature. However, whether Microsoft should be pushing a proprietary standard, built into Windows, with a range of plug-in Microsoft products might run the company head first into a string of antitrust lawsuits.

LIVING LA VIDA LINUX

'Tried it. Didn't like it. Went back.' We sometimes hear of people who tried some earlier release of Linux, but it wasn't Windows so they went back.



Here is a reverse case to balance your books. As a user of Linux and other operating systems, I decided to give Windows XP a try.

Initially I was impressed. It started quickly on a 3GHz P4, launched applications quickly and closed quickly – at least for a while. However as more applications, patches and service packs were applied it got slower. Windows always seems to have strange processes running, so you do not know what belongs where. The firewalls and virus checkers only seem to add more confusing processes to the list.

Then one day it stopped and nothing would start it. I couldn't even re-install it, so I took it to a Windows expert. Five days and $200 later it was fixed. He repeatedly attempted to reinstall and eventually succeeded, but he had no idea what the problem was. It scares me when experts cannot understand Windows. (I suppose they haven't seen the source code.)

I was also initially impressed with the wizards, which make setting up things such as networks easy, if they work. When they don't work, they are a nightmare and there doesn't seem to be any way to undo whatever strange things the wizards do. Deliver us from Windows registries and give us human-readable configuration files any day. And then 'any day' came. I gave the XP PC to my son and went back to Linux – where users know what is going on and the system doesn't do things behind your back.

N Krautz

NOT SO DREAMY SCREEN

After reading your article Dream Screens (*March 2005, page 60*), I purchased a CMV CT-720D and am very disappointed with it. What no-one seems to mention in previews is, that when running these LCD screens at the recommended resolution of 1280 x 1024 all text and windows become miniscule. When on the internet some of the articles on websites are very close to illegible.

At this point I am running on lower 800 x 600, and only

switching to high res when I print photos. I don't find this satisfactory after sidelining my perfectly good CRT and forking out for a new monitor.

I've rung the distributors and while they did their best to be helpful and were very courteous, they could not solve the problem. In an internet forum, one contributor said that when he undermined by Telstra's use of 'pair gain'. I can't believe in today's age, someone who lives well within the Adelaide metropolitan area cannot make use of the competitive ADSL market. Instead I am restricted to my 56kbps dial-up connection, which actually runs at 28kbps due to (you guessed it) pair gain.

Of course, my other option (excluding satellite) is to install cable internet. Nothing wrong with that besides Telstra being the only supplier in Adelaide, meaning I have to fork out $50/month for a measly 500Mb download limit or $60/month for unlimited.

Every time I see a Telstra ADSL commercial I feel like throwing something at the

'It scares me when experts cannot understand Windows. (I suppose they have never seen the source code.)'

set his elderly mother's LCD on low resolution to help her see the text, the text became too large and was cut off at the base of windows, I sometimes find this also, and he felt that Microsoft should address this problem. I think this matter should be given more publicity and can't help but wonder how many other LCD users are tolerating it!

J Shah

Darren Ellis replies:

There is a large difference between 800 x 600 and 1280 x 1024, especially if you were used to the former on your previous monitor. There is a way to change web page text to make it more readable, though. If your mouse has a scroll wheel, hold down <Ctrl> and scroll up to increase the font size in both Firefox and IE. If not then go to View | Text Size. To change windows sizes, right click on your desktop and click the Appearance tab.

DREAMING OF ADSL

In reference to G Wiles (May, 2005), I too am absolutely flabbergasted that I cannot get ADSL; having my ADSL-equipped exchange television. I *would* sign up if I *could*. In addition, I have registered my interest at Telstra.com but can't see it getting anywhere considering there were only 3 other expressions. So all I can do now is sit back and enjoy my lightning-fast 28kbps dial-up connection.

S Napoli

GETTING IN TOUCH

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EMAIL writeon@pcauthority.com.au
FAX Write On, *PC Authority* on (02) 8399 3622

Please limit letters to 200 words. *PC Authority* extends a hearty congratulations to this month's competition winners. We've had a tremendous response to our competitions, and we'll be sure to keep the prizes coming.

COMPETITION WINNERS

P Cunningham; J Haas; C Mills; S Norman; J McKervey; L Romana; T Nicholls; J Ventnor; K Membrey; J Heidemann; J Price; S Harrison; J Velona; N Meyer; M Murray; S Galea.

THE INVESTIGATOR

An MP3 player is a considerable investment, but if it breaks down out of warranty should there be a loyalty discount on the next one? Ty Pendlebury investigates.

The cost of HDD players has plummeted drastically in the past 18 months, with the new 60GB iPhoto available for less than the price of the original top of the range 20GB iPod. Reliability has increased too, because as we've already discussed in these pages, battery life and maintenance are an issue with some of these older players. To complicate matters, iPods are 'non-user serviceable' and require a technician – in or out of warranty.

'He was concerned he had to pay the same as a new model to get his iPod replaced with a potentially used item – scratches and all.

Our reader, A Lovell, faced similar problems when his third generation iPod started to fizzle out. It wasn't the battery in this case, but the hard drive. It was out of its warranty period by 4 months, so he took it in to his local Apple dealership to see what they could do. He said he got the impression it was a common problem from the staff there but they couldn't help him – he would need to visit the Apple website and fill out a form.

Here to help

We welcome consumer complaints and questions, and we'll do our best to help find a solution for all parties involved. If you're the victim of poor sales, dodgy service or any other kind of dispute, we need to hear about it. If you'd like our help, email us at: investigator@pcauthority.com.au.

Please note that the companies or individuals mentioned here are meant to illustrate the typical problems that an ordinary consumer could face. If a company is mentioned here it shouldn't be taken as an indication that incidents described are typical of that particular company.

Please don't use the *PC Authority* or The Investigator name as leverage to get more than you are entitled to.

SO FAR, SO GOOD?

After completing the form he was presented with a message: 'OK, you have been verified. Just send in your iPod and we will send you a replacement iPod of similar type and condition (new, as-new, or refurbished as Apple determines). Click here, and you agree to pay $367 plus $20 postage COD.'

Our reader wasn't happy with this, as he felt that he didn't get the full value out of his original purchase. He spoke to Apple and pointed out that it only cost $439 for a fourth generation iPod with all accessories and a twelve month warranty. It would also include free shipping and laser engraving.

The refurbished model, on the other hand, came with no accessories and only a three month warranty. He was concerned he had to pay the same as a new model to get his iPod replaced with a potentially used item – scratches and all.

Mr Lovell then suggested some kind of loyalty return scheme whereby you could return your old iPod (working or not) for a 50 percent discount on your next one. The response from Apple, which is similarly echoed by many IT product manufacturers, was that it was unable to reduce the replacement cost of the iPod for him.

REPLACE OR BUY AGAIN?

Essentially, what Apple's returns system offers is an 'as new' (read potentially brand new) iPod at a discount on the full price.

As the Apple site itself says: 'The replacement iPod will be functionally equivalent to your iPod when new.' So, the unit would be not be scratched, as our reader feared, and would be virtually indistinguishable from a new unit.

For spare parts purposes Apple are required to keep old hardware for up to seven years, so it's likely that if you have a first generation iPod, yours will be replaced with an 'as new' first generation model.

Whether or not this is a good deal is ultimately up to the end user. A quick browse of eBay shows that even a second-hand first generation iPod can still fetch over $200, and of course it doesn't even have the three month Apple warranty.

Mr Lovell decided none of the options available presented a good deal for him – he decided to purchase an Archos MP3 and video player instead.

If you're about to buy a product like an iPod that has a 12-month warranty you need to ask yourself whether you are likely to upgrade it after the warranty period is over. Electronic goods, particularly PC parts and accessories, depreciate considerably, and it's quite likely that after 12 months the component will no longer be available. And in the iPod's case there has been a new generation of iPod every year since the device was released.

CONCLUSION

Both the hi-fi and IT worlds have run on endless upgrade cycles since the year dot, and very few companies offer 'buyback' schemes similar to the one Mr Lovell is suggesting.

Of course, no one wants to buy a music player that dies the very next day after the warranty runs out, so always weigh up the cost of spending a little extra on an extended warranty plan. ■

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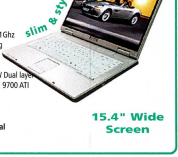

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THE A-LIST

Only the absolute best of the best make it to The A-List. Also, check out the Upgrade Guide on *page 30*, telling you what spec to aim for when buying or upgrading your PC.

FAST RESPONSE TFT

PC AUTHORITY RECOMMENDED

p41

BenQ FP71V+

PRICE: $799
SUPPLIER: BenQ (02) 9714 6800
ISSUE: Recommended, *June 2005, page 41*

NEW

DIGITAL COMPACT CAMERA (5MP)

PC AUTHORITY RECOMMENDED

p47

Sony Cyber-shot DSC-W5

PRICE: $599
SUPPLIER: Sony (02) 9878 9712
ISSUE: Recommended, *June 2005, page 47*

NEW

DIGITAL COMPACT CAMERA (7-8MP)

PC AUTHORITY LABS WINNER

p72

Samsung Digimax V700

PRICE: $899
SUPPLIER: Adeal (03) 8369 4444
ISSUE: Labs Winner, *June 2005, page 72*

NEW

WHAT DOES IT ALL MEAN...

PC AUTHORITY LABS WINNER

LABS WINNER

These awards are given to the products that truly excel in a group comparison situation. These products have beaten every other similar product in their category. More than anything, Labs Winners have impressed the Labs team and are worthy of purchase.

PC AUTHORITY RECOMMENDED

RECOMMENDED

Products given this award are either second to the Labs Winner and may have been awarded for exceptional perfomance, value or features, or may have been reviewed as a standalone product but impressed the Labs team. Recommended awards come from the Labs team's extensive experience.

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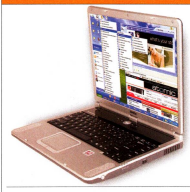


Targa XTender A510

PRICE: $2150
SUPPLIER: www.akatech.com.au (02) 9896 5688
ISSUE: Labs Winner, *March 2005, page 68*

HOME MEDIA NOTEBOOK

Pioneer Notebook 47DK

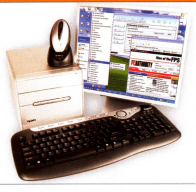
PRICE: $3799
SUPPLIER: Pioneer Computers (02) 9690 2888
ISSUE: Labs Winner, *December 2004, page 85*

PERFORMANCE PC

Modtech Civic-64FX

PRICE: $6400
SUPPLIER: Modtech Computers 1300 303 928
ISSUE: Labs Winner, *January 2005, page 98*

HOME MEDIA PC



Capitol Dreamstation

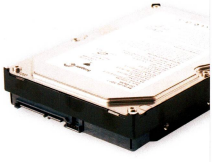
PRICE: $3250
SUPPLIER: Capitol Computers (02) 9281 8890
ISSUE: Labs Winner, *December 2004, page 82*

PCI-E GRAPHICS CARD

PowerColor X800 XT

PRICE: $749
SUPPLIER: Australia IT 1300 668 715
ISSUE: Labs Winner, *February 2005, page 67*

HARD DISK



SEAGATE BARRCUDA 7200.7 SATA

PRICE: $206
SUPPLIER: Ingram Micro 1800 464 726
ISSUE: Labs Winner, *October 2004, page 69*

SOUND CARD

Creative Sound Blaster Audigy 2 ZS Platinum Edition

PRICE: $499
SUPPLIER: Creative (02) 9021 9800
ISSUE: Labs Winner, *November 2004, page 68*

DVD BURNER

LG GSA4120B

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SUPPLIER: LG Electronics 1800 643 156
ISSUE: Labs Winner, *February 2005, page 81*

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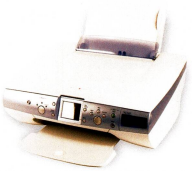
PRICE: $3848
SUPPLIER: Kyocera Mita 1300 364 429
ISSUE: Labs Winner, *April 2005, page 63*

PHOTO PRINTER



Lexmark P6250

PRICE: $399
SUPPLIER: Lexmark (02) 9930 3500
ISSUE: Labs Winner, *January 2005, page 66*

MULTIFUNCTION PRINTER

Canon PIXMA MP780

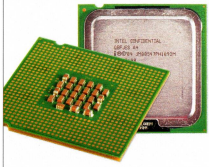
PRICE: $599
SUPPLIER: Canon (02) 9805 2000
ISSUE: Labs Winner, *May 2005, page 90*

DIGITAL VIDEO CAMERA

Panasonic NVGS400

PRICE: $3099
SUPPLIER: Panasonic (02) 9986 7400
ISSUE: Recommended, *December 2004, page 46*

HIGH PERFORMANCE CPU



Intel Pentium 4 3.7EE

PRICE: $1694
SUPPLIER: Intel
ISSUE: Recommended, *May 2005, page 73*

PHOTO EDITING

Adobe Photoshop Elements 3

PRICE: $179
SUPPLIER: Adobe 1300 550 305
ISSUE: Recommended, *January 2005, page 53*

OFFICE SUITE

OpenOffice 1.1.2

PRICE: FREE
SUPPLIER: OpenOffice www.openoffice.org
ISSUE: Labs Winner, *January 2005, page 76*

WEB BROWSER

Mozilla Firefox 1

PRICE: FREE
SUPPLIER: Mozilla.org
ISSUE: Recommended, *March 2005, page 50*

IMAGE EDITING

Adobe Photoshop CS

PRICE: $1299, ($329 upgrade)
SUPPLIER: Adobe Australia 1300 550 205
ISSUE: Labs Winner, *October 2004, page 92*

INTERNET SECURITY SUITE

F-Secure Internet Security 2005

PRICE: $125.28 for first year; $87.80 thereafter
SUPPLIER: Open Systems (02) 6261 4900
ISSUE: Labs Winner, *April 2005, page 76*

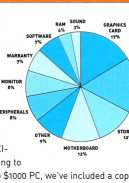
A-List: Upgrade Guide

We received a great deal of feedback about our budget PC target price of $2000. In response, we've revamped our target systems, breaking them down into three new categories: budget, mid-range and performance. Given the flexibility of current generation computer hardware, each of these machines are more than capable as a business, home or performance system, and your only consideration is price. Let us know what you think of the new targets by emailing us at: **alist@pcauthority.com.au**.

BUDGET PC

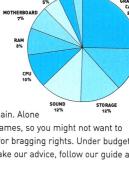
This month we've again slightly blown out our target $1000 system cost, although as it's a guide, you could easily shave off the excess $96 by shopping around. We still firmly believe this PC is as competitive as any other you'll find for its price range. It features a 64-bit CPU for tomorrow's applications, a RADEON 9550 graphics card for desktop use and 3D gaming and twice the memory you'd normally find in a system of this cost. Again we've opted to go with Fedora Core 3, because it's free and one of the better Linux distributions we've reviewed. Add $135 to the price if you'd like to add Windows XP Home to the package.

MID-RANGE PC



Our medium price PC system is more entertainment focused than its basic beige brother. It's designed to be able to play the latest games, edit movies and still manage the day-to-day tasks of word processing, email and internet browsing with ease. Missing our budget by the smallest of margins, we've still managed to include a 2GHz Athlon 64 processor, and have moved to the newest generation PCI-Express graphics interface, in turn needing to replace the motherboard. Unlike the sub $1000 PC, we've included a copy of Windows XP Home OEM, but you can save yourself the best part of $150 by using Linux.

PERFORMANCE PC



We're still looking at AMD for performance this month, taking the Athlon 64 3500+ for its great performance to cost ratio and overclocking flexibility. After the CPU, the next component you'll look at is its graphical prowess and we've picked a motherboard that supports the PCI-Express interface. As the motherboard also supports SLI, you can (if you're keen and have deep pockets) opt for a second identical card for a further performance gain. Alone this card is more than capable of eating games, so you might not want to upgrade straight away, unless it's purely for bragging rights. Under budget and tearing at the seams with performance, take our advice, follow our guide and build yourself a computing beast.

Budget PC

TARGET PRICE: $1000

COMPONENT	DETAILS	TARGET SPECIFICATION	PRICE
• CASE	Midi tower	350W+ PSU; 3+ bays; front USB	$90
• CPU	AMD Athlon 64	3000+; 1.8GHz 512KB L2 cache	$249
• MOTHERBOARD	NVIDIA nForce3 chipset	USB 2.0; 6 channel audio; AGP 8x; 10/100 Ethernet	$186
• RAM	512MB PC3200 DDR	400MHz DDR SDRAM	$84
• GRAPHICS CARD	RADEON 9550	AGP; 128MB DDR RAM	$115
• MONITOR	17in CRT	1024 x 768 @ 85Hz minimum	$168
• SOUND CARD	Integrated sound	Integrated in motherboard	$0
• SPEAKERS	None	None	$0
• HARD DISK	80GB PATA	7200rpm; Parallel ATA; 2MB cache	$92
• OPTICAL DRIVE	CD-RW; DVD-ROM IDE	52x CD-RW; 16x DVD-ROM	$70
• NETWORKING	Integrated 10/100	Integrated in motherboard	$0
• MOUSE	Basic mouse	Optical; 2-button; wheel; USB/PS/2	$22
• KEYBOARD	Basic keyboard	104-key keyboard	$20
• OPERATING SYSTEM	Linux	Fedora Core 3	$0
• PERIPHERALS	N/A	None	$0
• WARRANTY	Standard	3 years RTB	$0
Total			$1096

Mid-range PC

TARGET PRICE: $2000

COMPONENT	DETAILS	TARGET SPECIFICATION	PRICE
• CASE	Midi tower	350W PSU; 4+ bays; front USB	$170
• CPU	AMD Athlon 64	3200+ 2.0GHz; 1MB L2 cache	$332
• MOTHERBOARD	nForce 4 chipset	USB 2.0; 8 channel audio; PCI-E; RAID; Gigabit Ethernet	$242
• RAM	512MB PC3200 DDR	400MHz DDR SDRAM	$84
• GRAPHICS CARD	NVIDIA 6600GT	PCI Express; 128MB DDR RAM	$332
• MONITOR	17in CRT	1024 x 768 @ 85Hz minimum	$168
• SOUND CARD	Integrated sound	Integrated in motherboard	$0
• SPEAKERS	2.1	25W RMS 3 piece	$65
• HARD DISK	120GB SATA	7200rpm; Serial ATA; 8MB cache	$160
• OPTICAL DRIVE	DVD+/-RW	16x DVD+/-R/RW dual layer	$110
• MODEM	N/A	None	$0
• MOUSE	Basic mouse	Optical; 2-button; wheel; USB/PS/2	$22
• KEYBOARD	Enhanced keyboard	Ergonomic or extra functions	$60
• OPERATING SYSTEM	Windows XP	Home Edition	$135
• PERIPHERALS	N/A	None	$0
• WARRANTY	Enhanced	3 years on-site same day	$150
Total			$2010

Performance PC

TARGET PRICE: $4000

COMPONENT	DETAILS	TARGET SPECIFICATION	PRICE
• CASE	Midi tower	350W+ PSU; 5+ bays; front USB	$200
• CPU	AMD Athlon 64	3500+; 512KB L2 cache; 2.2GHz	$412
• MOTHERBOARD	NVIDIA nForce4 chipset	Dual channel DDR; 7.1 audio; USB 2.0; 2 x Gigabit Ethernet; SATA RAID; 2 x PCI Express	$266
• RAM	1GB PC3200 DDR	400MHz DDR SDRAM	$335
• GRAPHICS CARD	NVIDIA GeForce 6800 Ultra	PCI Express; 256MB DDR	$1000
• MONITOR	17in LCD	1280 x 1024 max resolution 8ms	$499
• SOUND CARD	7.1 PCI	24-bit; 7.1 output; EAX	$200
• SPEAKERS	7.1 surround	7 satellites; 1 sub-woofer; 92W RMS	$260
• HARD DISK	2 x 200GB SATA	7200rpm; ATA/150; 8MB cache	$375
• OPTICAL DRIVE	DVD+/-RW	16x DVD+/-R/RW dual layer	$110
• NETWORKING	Integrated Gigabit	Integrated in motherboard	$0
• MOUSE	Optical mouse	Optical; wheel	$0
• KEYBOARD	Enhanced keyboard	Ergonomic or extra functions	$150
• OPERATING SYSTEM	Windows XP	Home Edition	$135
• PERIPHERALS	Game device	Joystick/gamepad/wheel	$0
• WARRANTY	Standard	3 years RTB	$0
Total			$3942

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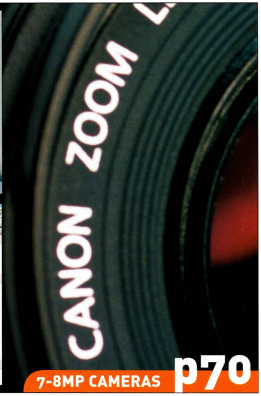
IN THE LABS

Want the best advice on what to buy?
Check out what's been through our Labs this month.

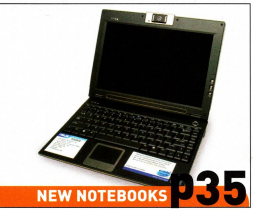
NO ONE TESTS TECH LIKE PC AUTHORITY

MEDIA STREAMER p64

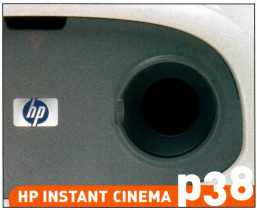
NEW BROWSER p63



7-8MP CAMERAS p70



NEW NOTEBOOKS p35



HP INSTANT CINEMA p38

p86 SLASH YOUR PHONE BILLS

REVIEWS

PCs AND NOTEBOOKS

Toshiba Tecra A4	35
ASUS W5000	35
Acer Aspire 1691	36

PERIPHERALS

Samsung D500	36
HP Instant Cinema ep9012	38
BenQ FP71V+	41
Polyview V293	41
Unibrain iZak	42
I-Rocks FM MP3 DJ	42
Xitel SOUNDaround	44
Sony Cyber-shot DSC-W5	47
Hermstedt Hifidelio	48
Linksys WRE54G	48
Buffalo LinkStation HD-H120LAN	51

SOFTWARE

Image-Line FL Studio 5 XXL	52
MSN Search	61
Directory Opus 8	63
Webroot SpySweeper Ent 2	64
AOL Browser	67

LABS ROUNDUPS

DIGITAL CAMERAS (7-8MP)

Introduction	70
Reviews	72
Swann 11-in-1 card reader	77
Sandisk Photo Album	77
Performance analysis	80
Feature table	82
Memory cards explored	84

VOICE OVER IP

Introduction	90
VoIP explained	88
Pricing plans	90
Spit and spam	102
Video conferencing	104

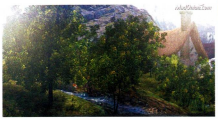
HOW WE TEST

Ever wondered which benchmarks we use to test the PCs, notebooks and peripherals?

THE BENCHMARKS

PCMark04
This strains and tests a machine's subsystems from CPU, RAM, HD and the whole.

3DMark03
An update to the benchmark, this version takes graphics performance to the next level.



3DMark2001 SE Pro
An old standard, this bechmarks flogs a video card's DirectX 8.0 capabilities.

3DMark05
The hardest yet, '05 taxes even the most capable system. We've yet to see this run well.

MobileMark2002

MobileMark2002
We use this tough benchmark to strain a notebook and it's battery to the limit.

Doom 3
An industry defining game, Doom 3 gives us a 'real-world' test of a system's capabilities.

THE YARDSTICKS

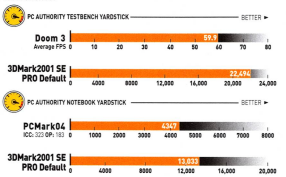
The yardsticks are used to test the equipment we get in for review, and are also used as yardsticks to gauge the performance of the PCs and notebooks sent in to us. The technology in these is refreshed frequently, and a big thank you goes out to ASUS, Altech, ABIT, AMD, Achieva and Western Digital for supplying the hardware used in our testbenches.

System

AMD Athlon FX-55 2.6GHz; 1GB DDR400 RAM; ASUS AV8 Deluxe motherboard; 256MB RADEON X800XT Platinum Edition; 2 x WD 74GB SATA HDDs; Windows XP Pro.

Notebook

AMD Athlon 64 3400+ 1.8GHz processor; 1GB DDR; 60GB HDD; ATI Mobility RADEON 9700 128MB graphics; Windows Media Center.



VIEW FROM THE LABS

The numbers that numb: when figures lose all meaning

These days many IT products are marketed less on what they have inside and more on what they can actually do. For instance the capacity of a digital music player such as the iPod is a meaningless number to the general public, but the ability to store *n*songs, *n*photos or *n*movies is a much more tangible concept.

For instance, the highest capacity iPod (the 60GB iPod Photo) can store 15,000 songs or 25,000 photos. That's a lot of music and photos, but stop for a second and try to picture just how many CDs or photo albums that might actually be. It's hard, isn't it? And even though another player might be able to store a thousand more songs, just how relevant is that? Exactly how many more CDs is a thousand songs?

What kicked this column off was a discussion with friends where we were talking about the shock and horror of the Boxing Day tsunami death toll, and how it just kept climbing. When the numbers were lower, a jump of a thousand deaths was horrifying, with each successive tick up the scale another numbing blow. But there came a point where the numbers turned from something horribly tangible to just numbers, even though the jumps were now coming in the tens of thousands and should have been much more horrifying to us.

Apparently there's a tipping point in human perception where numbers of objects make the transition from something you can picture in your mind, to just a number of objects. And surprisingly, that number's lower than you might think – it's around 2000.

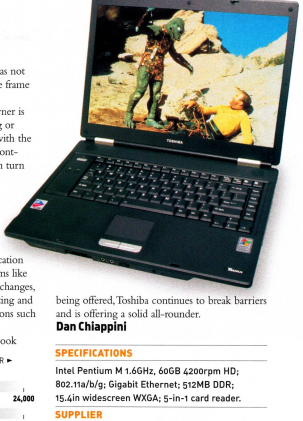
For instance I can easily picture what 2000 people might look like and at a stretch possibly 5000, but 100,000 or a million? Not a chance. It's the same with cash, pens, apples, anything. The perception of objects seems to go from the tangible, to a workable number or statistic to something completely fanciful.

I recently received a press release about a new 160GB portable hard drive, and while I can picture that 160GB capacity, I cannot quite as easily grasp the 2960 hours of music it can store and I certainly cannot in any way fathom the 740,000 JPEGs it can hold. Put another way in smaller graspable numbers: if you took a photo every minute of every day, 24 hours a day, it would take you almost a year and a half to fill the drive up.

But 740,000? That's just a pretty big number.

TOSHIBA TECRA A4

PRICE: $2530



LABS VERDICT

A solid performer with a good range of features and a price that won't send you to the poor house.

Performance	★★★★☆☆
Features	★★★★★☆
Value	★★★★★☆
OVERALL	★★★★★☆

Toshiba has come out with a brilliant widescreen notebook with some nifty features. While ASUS's W5 below is small and speedy, the Tecra A4 takes a slower, more relaxed look at computing. The two are fairly similar on the feature front, with only 200MHz separating the two on the CPU side.

The performance results are predictable, with ASUS having the edge in PCMark04. The gap opened a little in synthetic graphics testing, with Toshiba netting a 3DMark score that was not exceptional but enough for a reasonable frame rate in last generation games.

The bundled multi-format DVD burner is ideal for home or business file archiving or creating home movies in conjunction with the 4-pin side mounted FireWire port. A front-mounted wireless switch means you can turn the device on and off as required.

Any manufacturer can put together a notebook and sell it, but the bundled goods are usually the standout features. Toshiba includes a recovery disc for users for when things go pear-shaped. Also included is Toshiba Assist, an application for helping users with common problems like network configuration, security setting changes, system diagnostics for easy troubleshooting and an optimise menu with access to functions such as formatting removable memory.

Well priced for the amount of notebook being offered, Toshiba continues to break barriers and is offering a solid all-rounder.

Dan Chiappini

SPECIFICATIONS

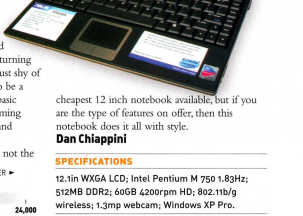
Intel Pentium M 1.6GHz, 60GB 4200rpm HD; 802.11a/b/g; Gigabit Ethernet; 512MB DDR; 15.4in widescreen WXGA; 5-in-1 card reader.

SUPPLIER

Toshiba 13 30 70
www.isd.toshiba.com.au

ASUS W5000

PRICE: $3299



LABS VERDICT

An impressive feature set and good performance is offset by its cost.

Performance	★★★★☆☆
Features	★★★★★☆
Value	★★★★☆☆
OVERALL	★★★★☆☆

Pitched by ASUS as a 'fashionable luxury' this notebook is easy on the eye and has some unusual, but welcome features. The most obvious of which is the inclusion of a 1.3 megapixel camera integrated into the bezel of the display. It swivels a full 180 degrees, meaning you can take photos of your surroundings or yourself by adjusting it accordingly. The included software allows you to capture stills, video or put it into a security mode which will take a series of photos in quick succession once an object enters its field of view.

In addition to this, it has a very well-rounded feature set, with a combo DVD/CD-RW drive, 802.11b/g wireless, 60GB 4200rpm hard disk, half a gigabyte of memory and comes bundled with a mouse and carry bag. As it's obviously a portable unit, it helps that this notebook weighs only 1.8kg with battery.

From a performance point of view, the W5 takes advantage of the Sonoma platform, bringing DirectX 9.0 quality graphics and performance for home and business users in the one notebook. Returning a commendable PCMark04 score and just shy of 5000 3DMark01SE points shows this to be a capable productivity, entertainment or basic gaming machine. It's not a high-end gaming device, but it is good for kicking back and playing a game during your downtime.

Stylish and packed with features, it is not the cheapest 12 inch notebook available, but if you are the type of features on offer, then this notebook does it all with style.

Dan Chiappini

SPECIFICATIONS

12.1in WXGA LCD; Intel Pentium M 750 1.83Hz; 512MB DDR2; 60GB 4200rpm HD; 802.11b/g wireless; 1.3mp webcam; Windows XP Pro.

SUPPLIER

ASUS 1300 278 788
www.asus.com.au

ACER ASPIRE 1691WLMI

PRICE: $2499

LABS VERDICT

An excellent value notebook which has performance and features to burn.

Performance	★★★★★★
Features	★★★★★☆
Value	★★★★★★
OVERALL	★★★★★☆

The Acer Aspire is a serious piece of hardware. It features one of the new bright, high-contrast LCD screens in a widescreen configuration and it is utterly gorgeous. Holding the unit reflects the substance behind the style, where the screen itself is well-braced and it won't flex easily. The keyboard also has a good action, the rubberised track pad is easy on the fingers, and there's a four-way scroll bar which works quite well.

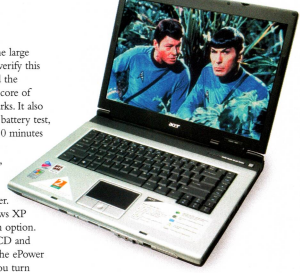
It's powered by a 1.6GHz Intel Sonoma processor, bolstered by 512MB of RAM and a relatively large 80GB HDD. It's a 'Premium Entertainment Portable' and both the large screen and dual layer DVD help to verify this claim. The RADEON X600 helped the notebook achieve a 3DMark 2001 score of 11,652 and PCMark 04 of 3313 marks. It also performed well in the MobileMark battery test, achieving a total of 219 minutes – 10 minutes more than rated.

As with most modern notebooks, legacy ports are no longer included, and you'll find three USB ports, a firewire port and a 4-in-1 card reader.

The notebook ships with Windows XP Home, though XP Professional is an option. Also in the bundle, you'll get NTI CD and DVD-Maker and PowerProducer. The ePower system tray icon is handy, and lets you turn features like LAN and wireless off in software, and monitor your battery life and system settings.

The Aspire is a very good unit with several features which enhance its usability. It will suit on-the-go entertainment and productivity, at a price that won't burn your wallet.

Ty Pendlebury



▲ A large but gorgeous notebook with excellent battery life and performance.

SPECIFICATIONS

Intel Pentium M 730 1.6GHz; 80GB HDD; 15.4-inch widescreen; dual layer DVD+/-RW; 4-in-1 memory card reader Microsoft Windows XP Home; 56Kb/s modem; Ethernet adaptor; 802.11b/g LAN; 2.95 kg; 364.x 279 x 38.9mm

SUPPLIER

Acer (02) 8762 3000
www.acer.com.au

SAMSUNG D500

PRICE: $799

LABS VERDICT

Well priced and excellently featured, the D500 is the phone everyone has been waiting for.

Performance	★★★★★★
Features	★★★★★☆
Value	★★★★★☆
OVERALL	★★★★★☆

It's not often that a company releases a product that is as functional as it is stylish, and can wow the masses in droves. Samsung's D500 does just this, combining the looks of its last generation E800 slide phone and a feature set to rival anything currently on the market. The phone is already critically acclaimed, taking out the award for Best Mobile Handset at the 2005 3GSM World Congress in February.

Targeted towards business users, budding photographers and entertainment enthusiasts on the go the D500 boasts a 1.3 megapixel digital camera with LED photo light, MP3 player and 96MB of internal memory. The memory is shared between the functions of the phone, with room to store MP3s (which can be used as ringtones), photos and video recording. Any one of these functions allows for about 60 minutes of video recording or 20 MP3 music files. There's no radio, but Samsung includes a set of headphones for MP3 playback.

Unfortunately there's also no facility for external memory expansion as is the case with Sony Ericsson's S700i, so you'll need to use it sparingly. Samsung also includes an external speaker with the kit which can be used for speaker phone calls or making your sound a little louder when playing back music, although we found the quality dipped slightly, with much more treble than expected.

Bluetooth is included for the first time and works with the sync function, allowing easy transfer of files to and from the phone. No Bluetooth dongle or USB cable is provided, so you'll need to purchase one.

The phone feels strong and solid, the hinge movement smooth every time without feeling at all loose or flimsy. The slide motion is natural and provides the keypad safety of a clamshell with the single handed operation of a normal handset.

There's very little wrong with the D500, though we will point out the three-second lag in taking photos. Barring this, and the lack of memory expansion, this phone is undoubtedly one of our favourites and is well deserving of our Recommended Award.

Dan Chiappini

▶ Wrapped in sexy black housing and boasting a killer feaure set, this is a must have phone.

SPECIFICATIONS

Tri-band 900/1800/1900MHz; 1.3 megapixel digital camera; LED flash; MPEG video capture; Bluetooth; MP3 player; 96MB shared memory; 262,000 colour TFT display; IrDA.

SUPPLIER

Samsung 1300 369 600
www.samsung.com.au

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HP INSTANT CINEMA EP9012 EXCLUSIVE

PRICE: $4999

LABS VERDICT

An extremely fine example of digital convergence nous, but too expensive for most.

Quality	★★★★★☆
Features	★★★★★★
Value	★★★☆☆☆
OVERALL	★★★★★☆

There are many things that are given the 'instant' moniker, but usually products from the IT world are not among their number. Slow PC boot times (whatever happened to instant-on PCs?) and a whole mess of configurations takes the instant gratification out of most technology even though we're in an instant gratification age.

Plonk the ep9012 down in the lounge room on the coffee table, plug in the power, and you're off and running. Hence, instant.

The unit has a scalloped, pearl white curved design that suits the lounge well, but a drawback is the entire unit's size.

It's quite large, standing at 32 x 52.4 x 40cm but it is surprisingly quiet.

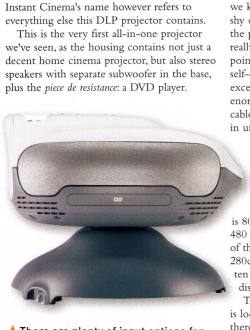
'The HP Instant Cinema ep9012 is one of the quickest projectors we've seen to go from power-on to image thrown.'

▲ Just add power and you've got a go anywhere instant home theatre ready to play.

While we're still approaching that tipping point between PCs as PCs, and PCs as ready-to-go appliances, it's nice to see a product come along that not only claims but deserves to have the word instant in its name.

The HP Instant Cinema ep9012 is one of the quickest projectors we've seen to go from power-on to image thrown (not a boot-up screen), with a time of around 30 seconds until she's ready. The real 'instant' in the Instant Cinema's name however refers to everything else this DLP projector contains.

This is the very first all-in-one projector we've seen, as the housing contains not just a decent home cinema projector, but also stereo speakers with separate subwoofer in the base, plus the *piece de resistance*: a DVD player.



▲ There are plenty of input options for other devices, including composite, component, DVI and S-Video.

The whole unit comes with a carry handle on the rear so it can be moved around, but a word of warning – it isn't exactly portable. Weighing in at 10kg without cords and accessories, this isn't something you can chuck in a backpack or even lug down the street comfortably, but when you consider it's a projector, DVD player and speaker system in one it's not so bad.

The other downside to the ep9012 which we keep coming back to is the price. At just shy of five grand it's quite expensive. Does the projector plus DVD player plus 2.1 stereo really equal $4999? Maybe, although the point of the ep9012 is that the entire unit is a self-contained system, and as such is exceptionally convenient. It saves an enormous amount of faffing about with cables and speaker set-ups, and is ready to go in under a minute.

But how does this enormous all-in-one perform? The projector itself is quite respectable, with a high 1600:1 contrast ratio compensating a little for the 840cd/m2 brightness.

While the unit's standard resolution is 800 x 600 it can take anywhere from 640 x 480 to 1024 x 748, and is capable of throwing an image sized from 94cm to 280cm diagonally at a distance of a meter to ten meters. It's also 16:9 capable and can also display 4:3 inputs.

The DVD player is a standard system, and is locked to Region 4. A good thing is that there are websites out there that allow you to change the device's firmware to allow for multi-region DVD playback and more. This is performed by inserting a burnt disc into the drive tray – it's obviously not HP sanctioned, and may void the warranty if you choose to unlock the regionality.

The DVD player supports many formats including MP3 CD, and is 5.1 Dolby Digital and DTS compliant. This is handy because the unit only comes with stereo speakers but features a digital coaxial output for 5.1.

The integrated audio is quite good for what it is however. It's remarkably clear, and omni-directional even though it's 2.1. Having the subwoofer in the base of the unit keeps the pounding bass from wobbling the projector around when the audio gets heavy, and the side mounted speakers do a good job of throwing the audio about as there are two speakers per channel (one angled toward the front, the other the rear).

All up it's a great projector, a good speaker setup, a good DVD player, and possibly the finest way to get your home theatre mobile in one extremely funky unit. But the price just brings me up short every time.

Darren Ellis

SPECIFICATIONS

Model L1752D; DLP projector; 800 x 600 resolution; 840 ANSI lumens; 1600:1 contrast ratio; image size: 94cm-280cm; throw distance: 1m-10m; in-built DVD player; DTS and Dolby Digital; in-built 2.1 speakers; inputs: Composite, S-Video, component, VGA and DVI video, stereo RCA in; outputs: stereo RCA, digital coaxial. Dimensions: 32 x 52.4 x 40cm. Weight: 10kg

SUPPLIER

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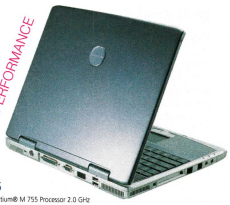

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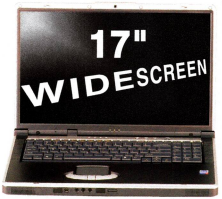

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OpenGL 1.5 Optimizations and Support
DVI, VGA, HDTV Output

www.leadtek.com.tw

BENQ FP71V+

PRICE: $799

LABS VERDICT

One of the fastest TFTs we've tested. Great image quality and vibrancy makes this a TFT to envy.

Quality	★★★★★★
Features	★★★★★☆
Value	★★★★★☆
OVERALL	★★★★★☆

The FP71V+ is another 17in TFT from BenQ, but the real selling point of this monitor is the super-fast 5ms response time. The FP71V+ is the first sub-6ms TFT to be tested in our Labs, but they've only just made it. ViewSonic also has a super-fast TFT on the way – and this one's a 4ms TFT.

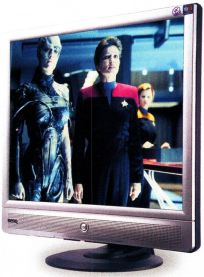
These are extremely fast screens, and we were a little dubious about these claimed speeds especially since they've come out so quickly after the 8ms screens. This is because the new ratings are based not on the time it takes a purely black pixel to tun to pure white and back again (the standard rating for response times of a TFT), but is based on the lesser known and potentially misleading, but more accurate rating of gray-to-gray (GTG). This is the time it take a pixel to go from one shade of grey to another and back – more accurate because most video, gaming and graphics work use a mix of these colours and not the polar extremes of black and white. It's also somewhat misleading because GTG is not an entirely accepted industry metric and is incompatible against those rated with normal response time measurements.

However, this 5ms GTG rating means that ghosting in movies and gaming is almost entirely eliminated, although under testing we did still register some tearing. The colours were extremely vibrant and the contrast and brightness ratios were also good. We were pleased to find excellent pixel tracking and timing lock, and the white saturation was almost perfect.

The FP71V+ also features what BenQ calls 'Senseye' image enhancement technology, which modulates the contrast, brightness and vibrancy of colours depending on what's displayed. With the polished screen this makes movie or gaming a pleasure on this TFT.

It's definitely one of the best TFTs we've looked at, and although the response rate may not be a true 5ms panel in the traditional sense, it is quite simply one of the clearest, fastest and gorgeous displays we've tested.

Darren Ellis



▲ The fast response time is fantastic for movies and gaming.

SPECIFICATIONS

17in TFT; 5ms GTG response time; 400cd/m2 brightness; 500:1 contrast ratio; 1280 x 1024 native resolution; DVI and RGB D-Sub video inputs; in-built speakers with SRS surround.

SUPPLIER

BenQ (02) 9714 6800
www.benq.com.au

POLYVIEW V293

PRICE: $499

LABS VERDICT

A large LCD with a bright, clear picture, and available for a good price, too.

Quality	★★★★★☆
Features	★★★★☆☆
Value	★★★★★☆
OVERALL	★★★★★☆

LCDs are finally hitting the sweet spot for price and quality. In the past 12 months the technology has been becoming more affordable and good enough for you to consider replacing your existing CRT screen. You'll now get more screen real estate for your money when comparing LCDs and CRTs of the same size.

The Polyview V293 capitalises on this by presenting a 19 inch screen which challenges even the 21 inch screens of old. This is a big screen – and cheap too. And the aesthetics are understated yet functional.

Of course, for such a rockbottom price there is one main compromise: fast moving scenes such as 3D games and action DVDs are presented with considerable smearing and ghosting, which is due to the relatively low pixel response time of 21ms.

As such, it's not the best choice for gamers or multimedia enthusiasts.

But that is only a minor consideration for everyone else. The screen itself is bright and clear, and boasts a large viewing angle – with only a slight discolouration at the extremes. It also has a good contrast ratio of 800:1 and OSD is easy to navigate and use.

On the connections side you have a D-SUB and a VGA output. There is also a 3.5mm input for the on-board stereo speakers.

The screen swivels sufficiently to enable a good viewing angle, but unfortunately not to the left or right. In the home this isn't necessary, but in a work environment this can be handy for displaying the screen to collegues

In summary, the Polyview is a good screen for general usage, and will also handle the very occasional game. It's an attractive monitor for a very good price. It ably demostrates that now is a good time to upgrade your old CRT.

Ty Pendlebury

▲ Well priced, the V293 is a good choice.

SPECIFICATIONS

19-inch LCD monitor; 800:1 contrast ratio; 1280 x 1024 resolution; built-in speakers; 418 x 431 x 232 mm; 4.6kg

SUPPLIER

Protac (03) 9560 7188
www.protac.com.au

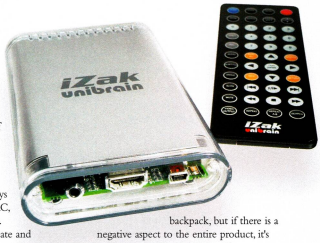
UNIBRAIN IZAK

PRICE: 40GB $698; 60GB $898

LABS VERDICT

An awesome all-in-one media player that unfortunately costs too much.

Ease of use	★★★★★☆
Features	★★★★★★
Value	★★★☆☆☆
OVERALL	★★★★☆☆



▶ Looks like a portable HD but does much more.

The beauty is in the iZak's brains and in the multitude of formats it can play back. It's a portable digital media player that offers full DivX support, plays MPEG 1, 2 and 4 (including XviD) and also plays back WAVs, MP3s, WMA, AAC, AC3 and Ogg encoded audio. Furthermore, you can also create and replay DVD backups of legitimate home movies by creating DVD ISOs on the drive. It can also play VOBs if you've backed up DVDs that way too, and the digital optical audio out features compressed DTS and Dolby Digital pass-through.

The user interface is simple, streamlined and easy to navigate with the slim remote, and while the UI looks great on a TV, it looks even better on higher resolution displays as it can scale up to 1024 x 768 for VGA, and even up to 1080i and 720p high definition for other screens.

If you don't just want to use the iZak as a media player it works just as well as a standard portable hard drive. The casing's certainly rugged enough for the travails of being shoved in a backpack, but if there is a negative aspect to the entire product, it's unfortunately the high price. There are many cheaper options – even do it yourself cases – on the market, but to be fair none have the iZak's overwhelming format support.

Darren Ellis

The iZak is at first glance nothing more than a transparent plastic portable hard drive. It has all of the hallmarks – small form factor, a single power LED at the front and a few nondescript ports at the rear. These include a mini-USB 2.0 port for connecting the iZak to your PC, a 3.5mm audio jack and a long slotted port for an adaptor in the box. The iZak though is much more than just a portable hard drive as it's a fully-featured media player.

The USB connector is for downloading movies, music and photos to the iZak, the 3.5mm port is actually a digital optical out port, and the long slotted port is for the bundled output adaptor dongle which features component and S-Video, plus stereo RCA jacks. There's even an adaptor for the dongle, which converts the outputs to a SCART connection.

SPECIFICATIONS

40 or 60GB 2.5in hard drive; USB 2.0; Component and S-Video out; stereo RCA and digital optical audio out; SCART adaptor; DVD, MPEG-1, -2 and -4, DiVX, XViD, WAV, MP3, WMA, AAC, AC3, Ogg media format support.

SUPPLIER

Camcom (02) 9418 8888
www.camcom.au.au

I-ROCKS MP3 CAR DJ FM TRANSMITTER

PRICE: $79.95

LABS VERDICT

It does what it says and does it well. A great alternative to replacing your whole car stereo.

Ease of use	★★★★★☆
Features	★★★★★☆
Value	★★★★★☆
OVERALL	★★★★★☆

▶ This music broadcaster takes the music off your memory key transmits it to any FM radio.

Implementing an in-car MP3 player can often mean an expensive overhaul to your audio system, or at the very least buying a fiddly, cable-strewn cassette adaptor for an existing MP3 player like an iPod. This assumes that you do have an MP3 player already though.

The I-Rocks MP3 Car DJ FM transmitter takes the pain out of things by accepting an audio input from an MP3 player, Discman or other audio source (3.5mm stereo jack) and re-broadcasts this over a narrow FM radio band. All you need to do is tune your car's radio into the I-Rocks frequency and off you go – instant MP3 player in your car.

It's not the first product of its type, in fact there have been many FM transmitters over the past half year that do the same thing, but the real differentiator with the I-Rocks unit is that it has a USB port on it. This turns any USB 1.1 or 2.0 memory key into a music store, and the I-Rocks acts as the controller. Considering the sheer number of USB memory keys on the market, this is an awesome feature. We tested it with a standard 128MB flash memory card and with a 5GB Seagate Pocket Drive and it worked wonderfully.

Powered by a cigarette adaptor on a hinged arm, the front of the I-Rocks transmitter has simple touch buttons for skipping forward and backward through tracks, pausing and playing. The lack of any form of LCD may dissuade some, but that's really asking for too much.

The I-Rocks is the perfect product if you've got lots of USB memory keys laying about, but haven't yet bought an MP3 player. There is an optional AC adaptor available so you can power it at home too, but as an in-car player it's excellent.

Darren Ellis

SPECIFICATIONS

MP3 FM transmitter (88.1MHz-88.9MHz, 106.7MHz-107.9MHz); USB 1.1 and 2.0 memory device support; 3.5mm stereo audio in.

SUPPLIER

Anyware (03) 9763 8200
www.anyware.com.au

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XITEL SOUNDAROUND

PRICE: $199.95

LABS VERDICT

Limited for computer use or if you already own an amp, but may be useful for simulating from a TV.

Quality	★★★★☆☆
Features	★★☆☆☆☆
Value	★★☆☆☆☆
OVERALL	★★★☆☆☆

Surround sound without the cost or the speaker clutter is an enticing prospect. The only question is: does it work? Like most surround sound simulators it boosts certain frequencies in the midrange that fool the human ear into believing they are coming from behind. This is something soundcards and hi-fi components have been doing for decades, with varying success. The SOUNDaround's major claim is that it uses the SRS TruSurround XT to simulate 5.1 surround with only two speakers.

Using the 3D environs of World of Warcraft as our test, we plugged the PC's stereo output into the unit and the unit into an amplifier. On headphones the effect of sounds emanating from behind was relatively convincing, although not in the ballpark of 5.1 quality. The sound seemed wider than normal and had more presence.

There is also a bass boost effect called TruBass built into the unit, but it only boosts 'mid' bass not the deep rumble of a true subwoofer. The Clarity button boosts the sibilants in speech which aims to make dialogue easier to understand.

Features aside, this a well-built unit, made of a faux metal plastic and gold-plated RCA connectors for better signal transfer. One drawback is that the only way to change the SOUNDaround's settings is via the remote – lose it and you're up the proverbial creek.

Ultimately, this surround sound simulator is really a one-trick pony. It's really an expensive EQ unit, but without the functionality. So, for those truly after good simulated surround, spend a little bit extra. For $239 you can get the M-Audio Revolution 7.1 soundcard, which includes the SRS TruSurround XT as one of its built-in effects.

Ty Pendlebury

▲ A basic remote control is supplied and is the only way to change some settings – don't lose it!

SPECIFICATIONS

SRS TruSurround XT processing unit; remote control; RCA cable; stereo RCA input and output; headphone jack.

SUPPLIER

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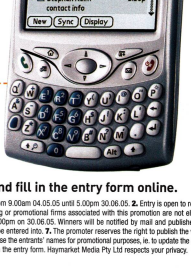
2 Requires expansion card, sold separately.



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SONY CYBER-SHOT DSC-W5

PRICE: $599

LABS VERDICT

A minor update, but superbly engineered and with great image quality.

Quality	★★★★★☆
Features	★★★★★★
Value	★★★★★★
OVERALL	★★★★★★

In a market saturated with choice, Sony has one of the largest camera line-ups of all – there are well over a dozen digital models in its range. The W1 (*December 2004, page 51*) was one of the stand-out designs in this plethora, and it's now been updated to become the W5.

Little has changed as far as the basic specifications are concerned. You still get a 5.1-megapixel sensor, coupled with a 3x zoom lens (f2.8-f5.2) bearing the Carl Zeiss name. The casing and layout of controls are also unchanged from its predecessor. But that's no bad thing; the alloy outer shell isn't particularly svelte at 35mm deep, nor is it exactly featherweight at 250g, but the simple addition of a protruding brace to one side of the lens, in which your middle finger rests, makes the camera easy to hold. The back panel is dominated by a huge and superb 2.5in LCD monitor. No Memory Stick is supplied with the W5: it's fitted with 32MB of internal memory, so when you do buy a stick you won't need to juggle two of them.

In use, one of the most impressive aspects of the W1 was its incredibly fast startup time. If anything, this has been slightly improved with the W5 – press the power button and the lens flies out of the body, leaving the camera ready to shoot in about 1.3 seconds.

Shot mode is selected via the top-mounted rotary dial. Fully manual, Auto, Program, Movie and Playback are the main selections, coupled with seven additional scene modes for portrait, landscape, night-time portrait and so on. Unfortunately, Sony hasn't taken the opportunity to redress the W1's missing aperture and shutter-priority modes, limiting its appeal as an everyday sidekick to the serious photographer. There's no Sport scene mode either; the ability to quickly put the camera into a mode where it would automatically select the fastest shutter speed possible would be a great deal more useful than the scene modes for snow and candlelight.

▲ The W5 is ridiculously good value for a compact digital camera.

'In use, one of the most impressive aspects of the W1 was its incredibly fast startup time.'

The system of using the four-way keypad (see image below) for shutter and aperture selection in Manual mode is cumbersome too. But in Program and Manual modes you do get spot and centre-weighted metering options as well as the default matrix mode, and the choice of spot or multi-area auto focus. And the option for a real-time onscreen histogram gives the opportunity to make sure you get even exposures.

In low light, a bright AF assist lamp comes into play to help focus, rather than the laser matrix of higher-end models like the V3. In very low light, this increases focusing time from well under half a second in normal light to about two or three seconds. However, it works over remarkably long distances – six metres or so gave it no problem and pictures were as sharp as they would be under standard light conditions.

Sony has nailed down camera movie modes to the extent that you hardly need to shell out for a camcorder any more. The MPEGMOVIE VX mode allows you to shoot movies with sound at up to 30fps with better-than-TV 640 x 480 resolution for as long as the internal memory or card has the capacity to store (in the case of internal memory, it's a minute at 640 x 480 in basic quality). There's even a limited video-editing facility in-camera, with cue and review controls and the ability to divide a movie file in two, primarily so you can free up memory space by deleting portions you don't want.

We were hoping that Sony would have abandoned the NiMH rechargeable batteries of the W1 in favour of Lithium-Ion, but those AAs are still there. In all honesty battery life is still so good you hardly need think about it – you'll get several days' normal use – and there's the option of popping in standard AAs if you get caught short.

Image quality is great, with low noise, a natural colour balance and a spot-on in-camera default sharpness algorithm that neither makes images look soft nor gives them unnatural sharpening halos. Chromatic aberrations (purple fringing) are also minimal.

Considering the price, the W5 gives you a hell of a lot of camera for the money. And like its predecessor, Sony's engineering skill means the inevitable price compromises such as the lack of Lithium-Ion battery are hardly compromises at all. The amount of manual control on offer is a little shy of what the serious amateur would want in an everyday compact, but for anybody else the W5 is an absolute steal.

David Fearon

▼ The huge 2.5in LCD on the back panel is bright and clear, but the four-way keypad is cumbersome to use in manual mode.

SPECIFICATIONS

2592 x 1944 maximum image resolution; 38-114mm equivalent, f/2.8-f/5.2 lens; 3x optical zoom; 2.5in TFT LCD; shutter speed 1/2,000th to 30 seconds; 100-400 ISO sensitivity, +/-2EV exposure compensation; centre-weighted, evaluative, spot metering; 640 x 480 movie mode; 32MB internal memory; Memory Stick/Memory Stick Pro slot; 2 x AA batteries (NiMH and charger included). Dimensions: 92 x 35 x 60mm (WDH). Weight: 250g (incl batteries).

SUPPLIER

Sony (02) 9878 9712
www.sony.com.au

HERMSTEDT HIFIDELIO

PRICE: $2299

LABS VERDICT

Manages and plays your digital music wherever you want without fuss or complication.

Quality	★★★★★☆
Features	★★★★★★
Value	★★★★☆☆
OVERALL	★★★★☆

If you haven't gone digital with your music collection by now, you're officially a Luddite. But getting your music from your PC to where it matters without fuss or annoying alert sounds spoiling the mood can be a challenge. This is where wireless music-streaming products come into their own, and the hifidelio aims to be one of the best in this arena.

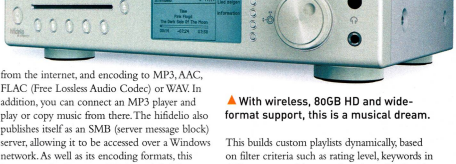
Looking like a high-end stereo unit, the hifidelio is finished in brushed aluminium or black. It has S/PDIF digital coaxial and optical ports and a pair of phono outputs to link to amplifiers, a built-in 802.11g wireless base station and four-port Ethernet switch. It works as a client with existing wireless networks, and can act as a base station or DHCP server for other network devices. Inside, there's an 80GB hard disk and a CD-RW combo drive.

To start with, you can rip your CDs and DVDs to its hard disk, using track information from its built-in database of album details or from the internet, and encoding to MP3, AAC, FLAC (Free Lossless Audio Codec) or WAV. In addition, you can connect an MP3 player and play or copy music from there. The hifidelio also publishes itself as an SMB (server message block) server, allowing it to be accessed over a Windows network. As well as its encoding formats, this import method supports WMA and OGG.

Lastly, the hifidelio can detect shared music libraries in iTunes. It also shares its own music in the same way, delivering up to five separate audio streams simultaneously across your network.

In use, the hifidelio is very simple. The player controls are arranged under the optical drive slot on the left, and navigation through menus in the large LCD panel is done using a combined jog and shuttle wheel. This all proved easy enough to be used without a hitch by non-technical family members – a particularly vital point for this kind of product. Editing metadata by hand (title, artist, genre and so on) with the wheel is less easy, but a USB keyboard or the browser-based network management provide good alternative methods.

As you'd expect, static playlists can be put together, both on the hifidelio or using the browser interface from your PC. What's more interesting is the hifidelio's Searchlist feature.



▲ With wireless, 80GB HD and wide-format support, this is a musical dream.

This builds custom playlists dynamically, based on filter criteria such as rating level, keywords in different parts of the metadata, date added to the list, and so on.

The hifidelio bridges the divide between computer and serious hi-fi equipment. Now your music can be available whether your PC's on or not, anyone can play it without going near the computer, and it can be shared with multiple clients anywhere in your house. It may seem pricey, but it's quite simply, highly desirable kit.

Keith Martin

SPECIFICATIONS

Network audio streaming server/client; 80GB HD; 802.11g WLAN; four-port 10/100 Ethernet switch; DHCP server; two USB 2.0 ports; optical/coaxial S/PDIF out; RCA phono out.

SUPPLIER

Vistra Systems (02) 9212 0200
www.vistra.com.au

LINKSYS WRE54G RANGE EXPANDER

PRICE: $189

LABS VERDICT

A simple way to extend your wireless network, best used with other Linksys products.

Quality	★★★★★☆
Features	★★★★★☆
Value	★★★☆☆☆
OVERALL	★★★★☆☆

Range performance is still a frustrating Achilles heel for wireless networks and this is where Linksys' Wireless-G Range Expander fits in. It's specifically designed to rebroadcast your WLAN over a wider area.

The Range Expander is small and neat, with a single, robust aerial and a design clearly meant for wall mounting. When it comes to installation, simply plug the Range Expander into a power socket near your access point and hold down the Auto configuration button for a few seconds. After that, two LEDs on the top illuminate blue to indicate successful association. The automatic setup won't work if your WLAN uses encryption, though.

Once it's associated with your access point you can use the supplied utility to tweak settings via a web browser such as configuring the IP addresses, change the SSID, channel and the MAC address of the remote access point, or turn off SSID broadcast. WEP can also be turned on here, but WPA isn't supported.

We associated the Range Expander with a Linksys WRT54GS Wireless-G router. We put the Expander near the back door of our office, then took a Centrino notebook into the courtyard where the wireless network was weak.

A test 200MB file copy from a desktop system attached via wired Ethernet to the WRT54GS router took 346 seconds, but with the Range Expander in between this was 208 seconds.

Although it can be picky about firmware combinations, we had no problems during testing. If you already own Linksys Wireless-G equipment, the Range Expander is an easy way to improve signal strength at longer distances.

James Morris

▲ Solve all of your poor wireless reception problems.

SPECIFICATIONS

802.11g wireless repeater; automatic b/g detection; one-touch automatic configuration.

SUPPLIER

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BUFFALO LINKSTATION HD-H120LAN

PC AUTHORITY RECOMMENDED JUNE 2005

PRICE: $499

LABS VERDICT

The answer to many network storage prayers: a well-built flexible network drive.

Performance	★★★★☆
Features	★★★★★
Value	★★★★★
OVERALL	★★★★½

After the excellent but slightly quirky ASUS WL-HDD 2.5 and flawed Linksys Network Storage Link (both reviewed *January 2005, page 39*) comes Buffalo's stab at affordable small-scale NAS (network-attached storage).

From the off, the LinkStation HD-H120LAN gives the impression of a well-designed product. The mirrored front panel hides status LEDs aplenty, including a Disk Full indicator that flashes when the internal 120GB hard disk is filled to 98 percent of its capacity. The case, while plastic, feels rugged: a small fan at the rear compensates for the lack of natural thermal conduction that a metal case would provide. Thankfully, the fan is so quiet as to be inaudible above the whisper-quiet drive itself. The case includes an internal power supply plugging directly into the mains, giving you one less irritating black box on the floor.

Installation requires running a one-time setup utility direct from CD. This can be run over the network or with the LinkStation directly connected to a local PC. The back of the device allows you to switch the network port into crossover mode for this, and when directly connected the setup utility automatically maps the drive to a local drive letter.

Although the setup CD includes a client software application, there's no need to install this on clients. Once set up, the LinkStation appears network-wide as a machine on the local network, with two default network shares: the main partition and a smaller 'info' share containing the manual and replicated CD software.

The LinkStation can be controlled via a tidy, good-looking and comprehensive web interface. Options include the ability to schedule disk sleep and wake-up times, excellent for integrating with a backup schedule. It even comes with a simple backup utility for the purpose, but we really do mean 'simple' – there are few options, aside from setting source destination folders and a schedule, and it simply dumps the contents of the source folders to the LinkStation: basic but effective.

The web interface also allows you to set up and change the Microsoft networking settings, such as workgroup name, and add extra shared folders complete with access restrictions on a per-user basis, or via definable groups of users. It will even talk to the primary domain controller on a Windows domain network and take its user list from there.

'...copying a 1GB file to the drive took two minutes, 57 seconds, equating to just under 6MB/s.'

But it doesn't stop at network storage: the LinkStation also sports two USB ports, one at the front, one at the back. You can't access the drive with these, but you can attach USB printers and extra external storage. Printers can then be accessed via the network, and extra external storage is mapped to a new network shared drive. A restriction with external USB storage is that it must be formatted by the LinkStation before it can be put to use. But this is offset by the fact that you can use the web interface to schedule automatic backups of the contents of the internal disk to the external one. The USB drive can also act as a recycle bin; when files are deleted from a shared folder, the file is moved to the USB drive under a hidden trash folder.

The speed of the unit is restricted by the network interface, rather than the disk itself: copying a 1GB file to the drive took two minutes, 57 seconds, equating to just under 6MB/s – fine for most purposes and faster than the Linksys device. Read speed was identical.

So, a stack of features, seamless and fuss-free operation and a reasonable price considering the capacity – there's also a 160GB version for $599 and a 250GB version for $699 that offers even better value for money. The LinkStation is the best device yet for small-scale NAS applications.

David Fearon

▲ The LinkStation provides almost near-silent storage.

SPECIFICATIONS

Network-attached hard disk; 120GB capacity; 10/100Mb Ethernet connection; 2 x USB ports for print server and extra external storage; FTP server; NTP server; web interface. Dimensions: 60 x 185 x 174mm (WDH). Weight: 1.3kg.

SUPPLIER

Uniden (02) 9599 3355
www.uniden.com.au

IMAGE-LINE FL STUDIO 5 XXL

PRICE: $599

LABS VERDICT

The improvements are fairly modest, but it's packed with novel music-making tools.

Quality	★★★☆☆
Features	★★★★★
Value	★★★★☆
OVERALL	★★★★☆

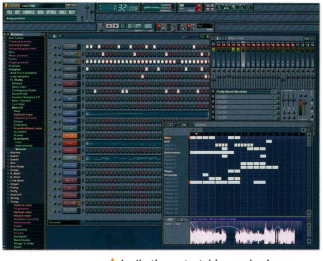
FL Studio has come a long way since its early days as a drum sequencer named Fruityloops. It now offers everything you need to create release-quality recordings and, with its generous collection of software instruments, it has much in common with Propellerhead's Reason. FL Studio offers two significant advantages over Reason, though: expandability via VST and DirectX plug-ins; and, in all but the entry-level version, recording of live instruments.

Three versions of FL Studio are available. Fruityloops Edition ($249) includes the bulk of the features. Producer Edition ($349) adds live recording, stereo wave editing, a more flexible mix architecture and dedicated EQ for each mixer channel. Finally, the XXL Edition ($599) adds video playback for writing music to picture, five extra synth modules and 2.4GB of samples, in addition to the 225MB included in all three versions. Downloads are also available – at a fee – from www.fruityloops.com, which is particularly good value, as they come with the promise of free updates for life.

Parts of FL Studio's interface still feel more like a drum machine than a full production environment. Instruments are picked from a list and then appear as a row on a step sequencer reminiscent of Roland's classic TR808. This suits drum programming, and the ability to drag and drop individual sounds from the Browser to automatically create a new sampler instrument makes FL Studio extremely user-friendly. Each sampler module comes with a reasonable set of controls, although cryptic abbreviations will make them difficult for inexperienced users.

However, the sampler is only one of 26 instruments in the XXL version – together these provide a massive palette of sounds with which to work. The one notable absence is a General MIDI synth, although the SoundFont Player could suffice, with the help of a suitable library. Instead, FL Studio specialises in analog-style synths and drum machines, piano, bass and guitar simulators, plus a range of abstract sound generators. Highlights include Wave Traveller, which creates vinyl scratch effects from curves drawn over a waveform, and BeepMap, which turns bitmaps into unearthly but surprisingly usable sounds. Slicer chops up sample loops into individual rhythmic elements in the same manner as Steinberg's ReCycle 2. This allows extensive customisation, although changing the slice points is fiddly if the automatic settings aren't quite right.

FPC is the only new synth module common to all three versions. Its interface mimics hardware drum samplers, such as Akai's MPC range, and provides an easy way to record a full kit of drum samples as a performance with a MIDI keyboard. It can also layer and velocity-split up to four samples per voice, but otherwise its editing capabilities are limited.



▲ Audio time-stretching and volume envelopes bring it closer to rivalling more established audio-production apps.

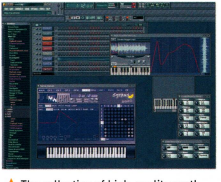
'The sampler is only one of 26 instruments in the XXL version providing a massive palette of sounds'

The extra modules included in the XXL bundle are more rewarding. DX-10 uses FM synthesis to produce some delightfully unpleasant digital noises. DrumSynth Live is a virtual analog drum machine, producing TR909-style sounds from scratch and thus affording complete control over their tone. SimSynth is a virtual analog synth that's surprisingly versatile considering its simple set of controls, although, once again, abbreviations will confuse inexperienced synth programmers. Lastly, Sytrus combines a variety of synthesis techniques and offers a baffling array of controls, but it sounds fantastic.

With so many sound generators to play with, it takes more than a drum sequencer to make the most of them. Fortunately, piano roll editing is available for inputting melodic parts, and MIDI keyboard performances can also be recorded. Song construction is limited to generating looped patterns and arranging them on a simple playlist, but patterns can be layered and be of any length.

The main new addition in version 5 is time-stretching, which is available for live recordings and in the Sampler and Slicer modules. Recordings can be stretched manually, but more useful is the ability to change the overall tempo and keep audio tracks in sync. Time-stretching is also useful for making loops play smoothly in the Slicer module, as well as having plenty of creative uses in the sampler.

Also new are automation envelopes for volume and pan-in audio recordings. It's a worthwhile feature, but despite other minor improvements to the recording functions they remain basic and, at times, clumsy. We also don't like FL Studio's mixer layout, with sounds arbitrarily assigned to channels rather than with one channel per synth module.



▲ The collection of high-quality synth modules remains the greatest strength.

Still, these criticisms don't detract from FL Studio's virtues. As a collection of software synths, it's a good-value package, and the ability to record live performance is a welcome bonus. FL Studio can play host to other software instruments in VST or DirectX format, but can also run as a VST instrument inside other host software such as Cubase. That means those who would be deterred by the pattern-based MIDI sequencer needn't be restricted to it. The XXL bundle's superb collection of synths makes it well worth splashing out on.

Ben Pitt

REQUIREMENTS

Pentium II; 16MB RAM; 115MB hard disk space (2.6GB for sample library); Windows 95 onwards.

SUPPLIER

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Successful as it is, Cookie Time was not satisfied with the status quo. To maximise the effectiveness of its mobile distribution network, the company turned to HP and HP business partner ROCOM Wireless for an end-to-end mobile printing solution for its distributors' vans.

"Being mobile, we realised our distributors would certainly be more effective if they had the ability to print and access data on the move," says Chris White, Cookie Time's manager of information systems.

Under the old system, Cookie Time distributors issued handwritten invoices to customers, entered sales details into a book, tallied invoices at the end of the day, then faxed or mailed them back to the office. Once at the office, data would be re-entered by office staff.

So Cookie Time enlisted HP's help because, according to White, "HP was top of mind for us as the leader in imaging and printing technology. We naturally turned to HP when it came to looking for a reliable, effective solution that would bring value to our business."

BUSINESS BENEFITS

The resulting mobile digital printing solution consisted of an HP Deskjet 450 infrared- and Bluetooth*-enabled mobile printer installed in each distribution van, as well as SalesLink software for near-real-time access to order processing and inventory update information. Used in conjunction with smartphones, the mobile printers generate invoices and sales reports through infrared connectivity. The solution integrated easily with Cookie Time's existing IT infrastructure, minimising the burden on IT staff.

Says White, "As a robust, fully integrated and economical system, HP's solution has made life simple and has allowed our sales force to be truly mobile. And for its size, the HP Deskjet 450 has delivered on its promise of reliability, page economy and performance."

Cookie Time's business benefits have been bountiful. Distributors save up to an hour a day and minimise inaccuracies, which allows them to spend more time with customers. Perhaps the most productive benefit of the new mobile printing system is the ability to gather near-real-time market data that facilitates market analysis, decision-making and inventory planning.

The solution also has direct bottom-line benefits. White concludes, "We believe the benefits of building customer confidence as well as collecting important sales data for decision making would help us break even on our initial investments within 12 months and generate incremental sales in the future."

THE IT SIDE OF MOBILITY

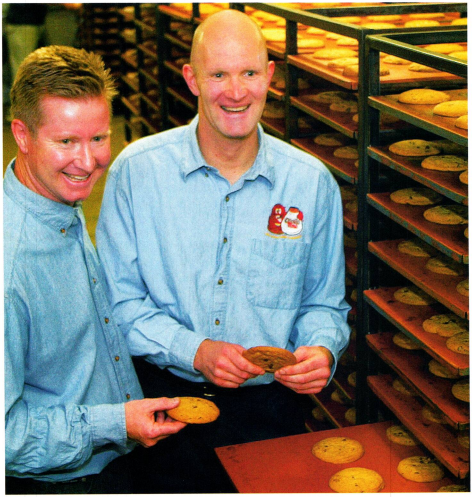
Just as important to the success of any mobility solution is the IT side of the equation. IT professionals must deploy reliable, dependable, affordable mobility solutions that enhance the business. These solutions must be a natural extension of existing infrastructure, they must augment key business applications, and they must be secure, manageable and easy to use. Otherwise, any solution—rather than enabling IT staff to support the needs of the business—will cause integration and support headaches.

One of the keys to the success of the Cookie Time solution was its easy integration with the company's existing IT systems. Another organisation that's reaping the rewards of an easy-to-use mobility solution is Victoria's Royal District Nursing Service (RDNS), which provides health services through more than 1,200 staff across the Melbourne metropolitan area and Mornington Peninsula.

The RDNS' record-keeping systems rely heavily on clinical note taking. Until recently, those notes were taken using pen and paper by travelling healthcare professionals, and then centrally filed. That system was inefficient and also meant workers didn't have access to case data while on the road visiting clients.

In 2003, the RDNS began providing HP Compaq Tablet PCs to staff. The experiment proved so successful that all staff involved in direct patient care are now equipped with Tablet PCs, which have proved especially useful given the increased emphasis on providing home care to minimise the time spent as an inpatient and the ongoing shortage of nursing staff.

"We have to be as efficient as possible to allow more face-to-face nursing time," says Ian Cash, General Manager for Information Services at RDNS. "The HP Tablet PCs have become invaluable to us in streamlining paperwork. It is



the versatility of the HP Tablet PCs we really like, and the fact they have continued to provide us with such a flexible service means they can be used anywhere." Each quarter, the RDNS meets with HP to assess its ongoing needs and ensure the technology is being matched as effectively as possible with patient care requirements.

"Our nurses need instant access to patient updates, clinical information, client appointment times and, of course general information such as new registrations, referrals and assessments," Cash says. "The wireless and GPRS phone network also means they have internet access to health Web sites at their fingertips, and can do on the spot drug and medication searches. This goes a long way to providing immediate information and reassurance to our clients, who do not now need the anxious wait for us to get back to them."

Mobility has also led to more efficient workplace management practices both on the road and at head office. "Our nurses now download schedules from home and are able to go immediately to their first client," Cash says. "Valuable time is saved by not having to go to the office first. Nurses can then take notes in a meeting or write up details of a client visit real time and are free to visit their next client."

"With wireless connectivity, client information is emailed to the office and recorded immediately. The mobile function is such that it can also record travel time, which is as easily done as pressing a 'start travel' and 'stop travel' button. This facilitates a much quicker processing of timesheets and expense forms."

The bottom line? "We couldn't manage now without our HP Tablet PCs," says Cash.

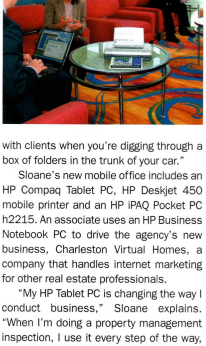
MANY CUSTOMERS, MANY IDEAL SOLUTIONS

Mobility, like most applications, must be shaped by business need—there is no "one-size-fits-all" scenario. It starts with understanding business needs and objectives. Only then is it possible to determine the right mobility strategies and the right technology fit.

That fit may or may not initially include wireless solutions. As mobile technologies converge and connectivity options become more available, it will be easier to spot the right wireless opportunities. In the meantime, companies should remember that mobility is about solutions and solution providers that address business needs.

Many companies use a combination of different devices to create complete, on-the-go solutions. Two such organisations are Sloane Realty of Charleston, South Carolina, and Albert Almeda Publicitat of Girona, Spain.

Sloane Realty Broker Associate J. Warren Sloane turned to HP solutions to help make him more mobile and his agency more productive. By nature, the real estate business involves a lot of paper, such as drawings, notes and contracts. But, says Sloane, "It's difficult to maintain a rapport



with clients when you're digging through a box of folders in the trunk of your car."

Sloane's new mobile office includes an HP Compaq Tablet PC, HP Deskjet 450 mobile printer and an HP iPAQ Pocket PC h2215. An associate uses an HP Business Notebook PC to drive the agency's new business, Charleston Virtual Homes, a company that handles internet marketing for other real estate professionals.

"My HP Tablet PC is changing the way I conduct business," Sloane explains. "When I'm doing a property management inspection, I use it every step of the way, taking pictures, importing them into the Journal and writing notes directly on them. I also print a copy of the inspection report on an HP Deskjet 450 mobile printer to leave with clients or send to the owners."

Everything that Sloane needs to do business is on his Tablet PC or online. He can fill out contracts in Journal, add special clauses and even capture signatures from clients on the spot. Then, back in the office, there's no need to enter contracts manually, since they're already in electronic format.

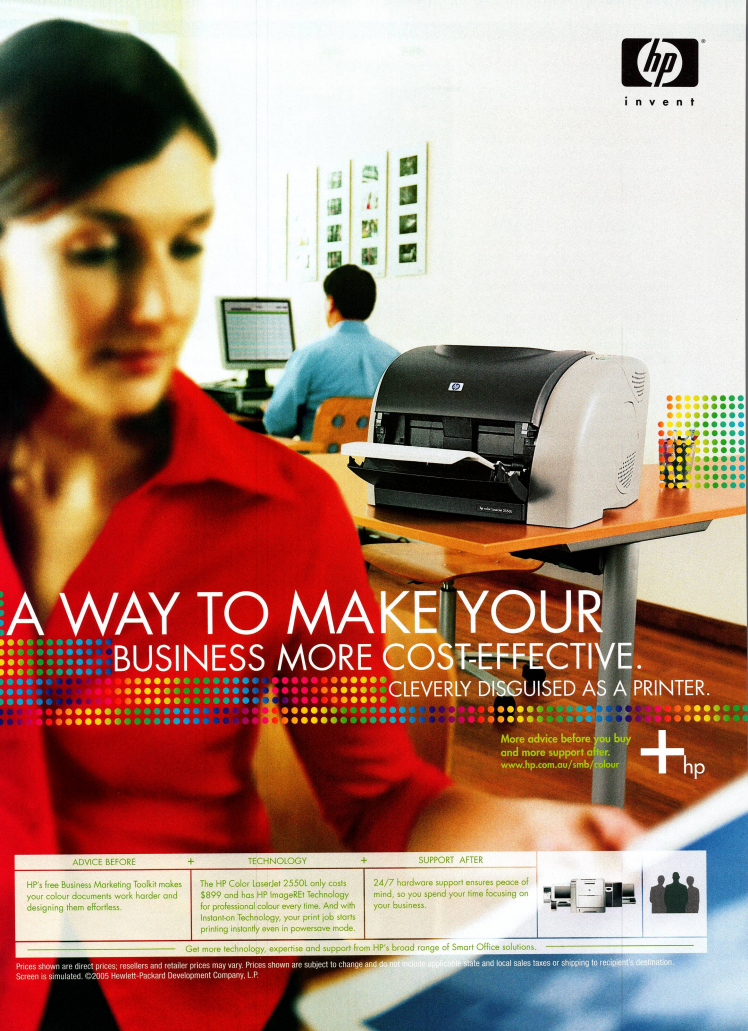
"I can honestly credit the HP Tablet PC with helping me close more sales," Sloane says. "For example, you're showing properties and the clients fall in love with a particular place. If you don't have a contract with you, you have to put them off to tomorrow … With the Tablet PC under my arm, I have instant access to all the contracts I need and can get them signed in minutes."

Sloan uses his iPAQ Pocket PC for scheduling, email and contacts, further increasing his productivity, which he estimates has gone up 10 percent with the Tablet PC alone. "HP products have solved some of my most difficult business problems without a lot of hassle," Slone elaborates. "They leave me free to focus on my core business, property sales."

Another company that uses HP technology to help serve its clients better is Albert Almeda Publicitat, a media company that specialises in helping customers create high-impact advertising campaigns. Since company founder Albert Almeda works alone and is out of his office most of the time, he needed a mobile solution that would allow him to access his centralised data no matter where he was working. That's because he was losing existing contracts and failing to win new business since he couldn't access the data that he needed unless he was sitting in the office.

The answer was a solution that included an HP iPAQ Pocket PC, an HP notebook running Microsoft® Outlook, a Vodafone mobile phone featuring Bluetooth technology and Symantec AntiVirus software to protect the whole package. Now Almeda carries all the information he needs on his iPAQ, which can be connected to the internet via the mobile phone. Data—which includes everything from contact information to radio commercials in MP3 format—can be synchronised with Almeda's notebook quickly and easily, so it's always up-to-date.

"The significant time saved by this implementation is valuable in terms of increasing revenue and has allowed me to become more flexible and focused in building client satisfaction and loyalty," Almeda notes. "HP, Intel®, Vodafone, Microsoft and Symantec made my mobile office possible. It's a huge advantage having your entire office inside your pocket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HP's free Business Marketing Toolkit makes your colour documents work harder and designing them effortless.
The HP Color LaserJet 2550L only costs $899 and has HP ImageREt Technology for professional colour every time. And with Instant-on Technology, your print job starts printing instantly even in powersave mode.
24/7 hardware support ensures peace of mind, so you spend your time focusing on your business.
Get more technology, expertise and support from HP's broad range of Smart Office solutions.
Prices shown are direct prices; resellers and retailer prices may vary. Prices shown are subject to change and do not include applicable state and local sales taxes or shipping to recipient's destination.
Screen is simulated. ©2005 Hewlett-Packard Development Company, L.P.

and accessible through such simple tools."

Other solutions HP provides that make it even easier to stay productive while on the go are mobile printing tools. Downloadable for free, these tools include Mobile Printing Software for Pocket PC (www.hp.com/go/pocketpcprint) and the HP Mobile Print Driver for Windows (www.hp.com/go/mpd4w).

COMMON THREADS

As we've seen, the power behind mobility lies in the ability to change the way work gets done, so employees are more productive and the business gets better results. Here are some common elements that small and midsize businesses should demand from their solutions and solution providers:

1. **Simplicity.** As illustrated by Victoria's Royal District Nursing Service, easy-to-use solutions can free up IT staff time for more strategic projects. That's why HP mobility solutions offer simple ways for businesses to be more productive—from flexible purchasing options that make solutions easy to own, to local expertise that makes solutions easy to customise and implement.
2. **Security.** Mobility solutions that don't protect data can jeopardize a business. That's why HP offers safer ways to help control and protect data while mobile. HP offers the latest encryption technology in its mobile devices as well as access controls on many of its products. And HP's PartnerONE network of over 200,000 local experts can help companies find the right security solution.
3. **Seamless connectivity.** Mobility is all about enabling access to business-critical data. HP solutions provide better ways to connect across voice and data networks through features like self-sensing connectivity. HP also works with over 200 global network service providers, including T-Mobile and Starbucks.

THE HP MOBILITY VALUE PROPOSITION

HP has a vast repository of mobility experience and expertise. Its combination of technology partnerships, product offerings and global channel partners puts the company in a unique position to meet customer needs. HP's portfolio of proven, mobility-enabled products includes desktops, notebooks and handheld PCs, servers and storage systems, and networking and management software designed to accommodate mobile customers without increasing IT's workload.

Services are also important. With HP's worldwide network of 70,000 partners, customers can access HP mobility services when and where they need them, from the provider of their choice. Through HP's certification program, customers can expect consistent, high-quality service.

One organisation that provides a great example of HP end-to-end expertise and solutions at work is Wesley Mission, the Sydney-based city ministry which is one of Australia's largest humanitarian organisations.

"Although the visible aspect of our organisation is working directly with people, like all businesses we are strongly IT dependent and couldn't function effectively, continue to grow or provide our quality services without our extensive HP suite of products," explains Peter Mann, Wesley Mission's IT Manager.

HP technology is used throughout the organisation, with more than 1,000 HP desktops and 100 HP ProLiant servers installed across the state, along with a wide range of notebook, iPAQ and Tablet PC solutions for mobile workers. Wesley has utilised HP systems since 1995, and in 2000 committed to an across-the-board HP implementation.

Reliability is a critical factor, especially for Wesley's Lifeline telephone counselling service, which handles more than 22,000 phone calls each year and depends mostly on volunteer staff.

"If one of our Lifeline volunteers has a potential suicide victim on the line, they need immediate, real-time access to information, databases and management support, including emergency services," says IT Operations Manager Ninos Khamo.

The dependability of HP technology has also allowed Wesley to redeploy its older systems for Internet cafe systems.

"We are not a rich organisation, and every penny spent on technology must earn its keep – we need to see value for money," Khamo says. "I am confident in HP because I know our upgrades are state-of-the-art, but also that the products will last us a long time."

Today, HP mobility solutions are enabling remote and mobile workers to access information and business applications away from their desks. Employees are using this newfound advantage to work more productively, better satisfy their customers and generate more sales. HP understands mobility. It also knows how to design hardware, applications and services that meet the needs of mobile workers and the IT departments that support them.

To download a white paper on this topic, visit smartbusiness.pcauthority.com.au/whitepaper

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MSN SEARCH

PRICE: FREE

LABS VERDICT

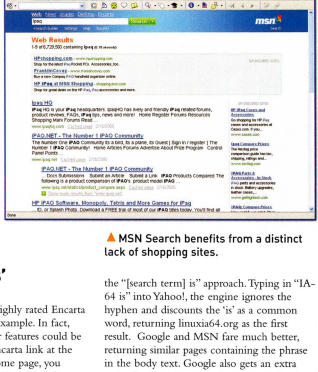
Microsoft's search engine shows promise and some nice features but its results need to improvements.

Ease of use	★★★★☆☆
Features	★★★☆☆☆
OVERALL	★★★☆☆☆

Over the past few years – combined with contextual advertising – searching has become the Web's biggest money-spinner. Given the enormous quantities of cash now at stake, it's no surprise that Microsoft wants to take a piece of the action from market leaders Google and Yahoo!. With the launch of MSN Search, it's now a three-way heavyweight fight for the attention of the world's searchers.

the relative weight by popularity, keyword matching or date. It doesn't have the resolution that the fancy graphics may imply, but it's handy to be able to sort by more than simply date order.

MSN Search also includes easy access to dictionaries, movies and music databases; not surprisingly, these feed off MSN's own content. However, Microsoft's broad existing product base is one of the principal advantages that the software giant can



▲ MSN Search benefits from a distinct lack of shopping sites.

'MSN Search also includes easy access to dictionaries, movies and music databases'

Today's search engine landing pages are clean to the point of sameness, almost universally consisting of a keyword entry box plus a list of search indices such as Web, Images and News. With Yahoo! and Google, much of the power is hidden behind Advanced Search features or through modifiers, such as 'domain:com.au dell', to restrict results for the search term 'dell' to .com.au domains. But, while potentially powerful, these features can be daunting obstacles to the casual searcher.

In an attempt to make this more accessible, Microsoft's SearchBuilder tool uses graphic-equaliser-style bars to allow the user to adjust

DEATH OF A DIRECTORY

Web directories have fallen out of fashion of late, as editors can't keep up with the explosive growth of the web. Nevertheless, they can prove more useful than search engines when researching an unfamiliar topic, as you tend to get a proper summary as well as a list of related sites. Given that Yahoo! began as a directory, rather than a search engine, it's no surprise that it scores well here, effectively mixing directory with search engine results.

The Google equivalent is based on the volunteer directory Dmoz.org, which has quietly been demoted to the backwater of Google services. Surprisingly, the MSN Search engine doesn't incorporate any directory listings at all, even though MSN operates its own 'small business directory' service.

bring to the market – its highly rated Encarta online encyclopaedia, for example. In fact, one of MSN Search's killer features could be that, if you click on the Encarta link at the top of the MSN Search home page, you receive a two-hour pass to Encarta Online, allowing you to use its vast content as part of your research.

When choosing the order in which to present results, search engines will add particular weight to keywords found in things like the page title or Meta tags. Priority may also be given to keyword density – the number of times a keyword or phrase turns up on a page.

A good illustration of the different approaches taken by Google, Yahoo! and MSN is searching for 'villas in France'. Although page popularity and other factors affect the ranking, both the Yahoo! and Google results give greater prominence if the phrase is within the page title.

MSN puts a greater weight on keywords within the body of the page. This approach can lead to a certain randomness, where the phrase appears among otherwise unrelated subject matter. It's a strategy that works when you look beyond the title tag, though. Look up 'iPAQ hx2400' in Yahoo!, and you'll get a page with iPAQ hx2400 in the title, but it's only a list of accessories. MSN's top result, on the other hand, was a hp.com page titled 'Handheld PCs at a glance'. The same HP site appeared only fifth in the Google listings, behind shopping-comparison sites with the device name in the title.

The keyphrase strategy also works well with the "[search term] is" approach. Typing in "IA-64 is" into Yahoo!, the engine ignores the hyphen and discounts the 'is' as a common word, returning linuxia64.org as the first result. Google and MSN fare much better, returning similar pages containing the phrase in the body text. Google also gets an extra point for including the whatis.com definition in the top three results.

Lastly, we tried the engines' ability to find local suppliers, using 'plumber' and 'Newtown' as an example. Google's listed results were poor, providing titles with 'Newtown' and 'Plumber' in the title or the text (some of whom were merely surnames), but no actual plumbers in Newtown. On the positive side, the Google adwords provided an excellent source of local plumbers.

Yahoo! did much better. It realised we were looking for a plumber and gave a good list, including some who covered Newtown. MSN gave us theatres, dance directors, a plumber in New Mexico and, finally, a plumber in Newtown... who died in 1872.

While Google is the gold standard of search engines, Yahoo! often still provides more useful and relevant results. Microsoft has some nice ideas and some intriguing plans for integrating its web search into its range of applications and services, but it clearly has some way to go to mount a serious challenge to its rivals.

Steve Maton

REQUIREMENTS

Internet connection

SUPPLIER

Microsoft via website
http://search.ninemsn.com.au

GET MORE RANGE

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Super G

GET MORE FREEDOM

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RangeMax
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Everybody's connecting.

DIRECTORY OPUS 8

PRICE: $85

PC AUTHORITY RECOMMENDED JUNE 2005

LABS VERDICT

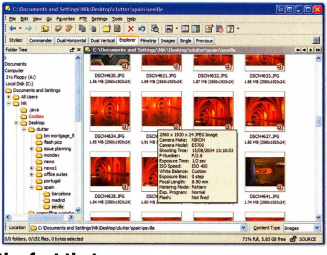
A major upgrade packed with time-saving shortcuts, it's a must for any Windows user.

Quality	★★★★★★
Features	★★★★½
Value	★★★★½
OVERALL	★★★★½

Ever wish Windows would preview a photo when you hover your mouse on its icon? We do. Do you miss having a proper file browser by default, such as the one in Windows 3.1? Want to do command-line tasks without actually using the command line? Join the club. Fortunately, though, now you can.

active, which is more than can be said for some Excel wannabes, as our office suites group test revealed (*January 2005, page 76*).

There are some thoughtful touches too. Connecting to a network share, particularly when it's located off-site can hang Windows for several seconds while it makes the connection. If you're running Opus, though, you get a dedicated Abort button that will cut the link if it looks like you're



▲ Directory Opus gives Windows the features you've always wanted.

'If there's one killer feature, though, it's the fact that everything works the way you think it should.'

We last looked at Directory Opus a long time ago and it felt more like an add-on to Windows Explorer than a worthy replacement. It's since reached version 8 and things have come on in leaps and bounds. Now you really can hover over an image and see a preview – complete with all the attached EXIF data. Better still, you can right-click it and convert it. This isn't a simple JPEG-to-GIF job; it handles PNG and Windows Bitmap too, and will also compress JPEGs. Bye-bye Fireworks. So long Adobe Image Ready.

Last time round, we criticised Directory Opus for not previewing all available file types, but after some swift retooling it can now display and interact with Microsoft Office documents. Change a set of numbers on a previewed Excel spreadsheet and your calculations will update inside the Opus window. The only reason you'd need to open it in Excel itself would be if you wanted to save the results.

But this isn't a dumb rendition restricted to the cells themselves. Smart Excel features such as expandable columns and draggable sliders remain

▲ Image searching and preview is much improved, including the ability to group disparate images from multiple folders.

making no progress. The same button appears when you navigate into a remote directory.

Other touches include colour-coding hidden files so you don't delete them, and thumbnailing absolutely everything so you can see what they might be without having to open them.

Even in spite of this, the software runs smoothly and feels fast. Image previews open far quicker than they do in the Windows viewer, although PDFs are appreciably slower as it must invoke Adobe Reader before it can draw them in. Movies start almost immediately, and we found ourselves navigating folders full of WMV files using Opus far quicker than when doing the same with Windows Media Player.

Upping the version count two stops has seen the introduction of Flash playback, but the movies don't respect the boundaries of the file stage, and so while they play correctly you also see hidden elements as they scroll off the edge of the frame, which rather spoils the effect.

We were more impressed by the concept of File Collections. If you collapse everything in the folder tree, only your Desktop and the Collections folder remain visible. 'Collections' is a place for organising a disparate set of files spread across several folders, drives, computers or remote servers. Organising them into subfolders within File Collections creates a set of easily located links, which should save you from scouring every drive for the data you're after. It isn't an entirely transparent endeavour, as opening one of the linked files dumps you into its original folder, and deleting the link rather than 'removing' it from the collection zaps the original (first-timers beware), but as a proof of concept it's an excellent add-on.

If there's one killer feature, though, it's the fact that everything works the way you think it should. There's no need for a manual, although a comprehensive 211-page PDF should answer any queries you might have. Instead, you can just click round the clearly defined interface, and if you think something should work a particular way the chances are it will. You can even redefine the whole interface if you like, using Opus Raw commands.

These commands are a set of simple yet powerful code lines that can be used to tailor the suite to your own particular needs, whether that means writing new functions from scratch or simply redefining some of the standard buttons. Several users have built themselves customised toolbars for burning CDs using third-party applications, and although most users will stick with the defaults it's an effective means of extending the features and takes Opus beyond the realms of a simple file-management plug-in.

Much of the rest of the suite can be customised through the Windows Control Panel, giving you a one-stop location for all the available settings and features. Rather bizarrely, we found its Control Panel applet had to be closed when conducting other system-level tasks, which goes to show how closely integrated Opus is with the rest of your Windows setup.

If this all sounds a bit too glowing to be true, then try it for yourself. We had a few concerns about the last release we reviewed, and came to the conclusion that its appeal would be 'limited for most users'. With the arrival of version 8, though, it's an entirely different story. This is an essential upgrade, and something from which Microsoft could learn a lot.

Nik Rawlinson

REQUIREMENTS

Windows XP.

SUPPLIER

GP Soft (07) 3366 1402
www.gpsoft.com.au

WEBROOT SPY SWEEPER ENTERPRISE 2

PRICE: 10-24 licences, $39.95 per seat

LABS VERDICT

Adds effective centralised management plus automated updates and definition deployment.

Quality	★★★★★☆
Features	★★★★★☆
Value	★★★★★☆
OVERALL	★★★★★☆

The latest SpyAudit report shows the instances of system monitors rose by 230 percent and trojans by 114 percent during the last three months of 2004. With an average of 24 instances of spyware being found per scan, across nearly 1.4 million separate machine scans, it's obvious this problem isn't going away.

'...system monitors rose by 230 percent and trojans by 114 percent during the last three months of 2004.'

Spy Sweeper is already a leading consumer anti-spyware product. With over one million licences sold in the first six months of release and deployment across 3500 corporations, it looks as though the Enterprise version is heading for the same status. There was a hiccup recently when a security vulnerability was uncovered in version 1.5.1, which could be exploited to enable local users to gain escalated privileges and execute arbitrary commands. This was caused by spysweepertray.exe invoking help functions with system privileges. Webroot immediately fixed this with the release of Spy Sweeper Enterprise 2.

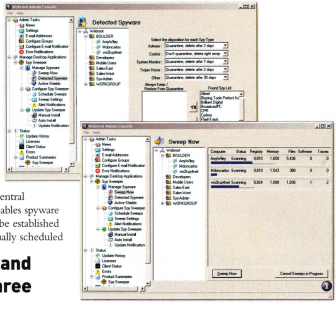
When launching this new version, Webroot announced the implementation of the first fully automated spyware research system, with the ability to scan millions of web pages per day. The combination of Phileas, as this research system is known, and the already well-respected Threat Research Team provides the back story to Spy Sweeper. These arm any enterprise using Spy Sweeper with access to a database that can detect and eradicate over 50,000 spyware traces.

Offering protection against spyware in the broadest sense, Spy Sweeper effectively guards against threats from adware, keylogging, malware, system monitors and trojans. It also enables you to centrally manage these threats across an enterprise of any size, reducing the time it takes to detect and neutralise the spyware threat on every desktop. Using a proven server-client approach, with central management by IT administrators rather than end users, Spy Sweeper deploys quickly, detects efficiently and quarantines effectively. It isn't the fastest scanner around, but it's very thorough.

This is the same basic architecture that has worked so well in the anti-virus industry. Rapid deployment is made possible by the use of login scripts, an internal software management product, or using Group Policy in Active Directory. Spyware definition updates and client software upgrades are handled automatically by the Webroot Enterprise Server. The central management console enables spyware policy and sweeping to be established locally, either on a manually scheduled basis or an automatic one. In the latter, the server component takes care of scanning, deleting, repairing and reporting.

Mobile users are catered for by the use of administrator-set policies. Users check the Webroot update server for definition updates when not connected to the corporate network, while automatic scans are performed when they do connect. The use of Active Shields on every desktop can, depending on configuration, protect against changes to system memory, Registry entries, host files, start-up processes and browser hijackings. Also, a lockdown feature lets administrators customise settings so that workstations comply to corporate security policy.

Davey Winder



▲ The central management console brings control and configurability to Spy Sweeper.

REQUIREMENTS

Server: 200MHz Pentium; 512MB RAM; 30MB hard disk space (1GB recommended for database growth); Windows NT 4 SP 5 or higher/2000/XP or Server 2003. Client: 150MHz Pentium; 32MB RAM; 15MB hard disk space; Windows 98/98 SE/ME (all require IE 6 SP 1)/2000/XP/NT 4/Server 2003.

SUPPLIER

Conexus (02) 9975 2799
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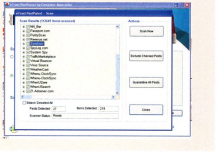
ANTI-SPYWARE: LAST MONTH

In the May 2005 issue of *PC Authority* we covered three anti-spyware programs from the paid-for eTrust PestPatrol and Spyware Doctor to the new(*ish*) AntiSpyware Beta program from Microsoft.

We found Spyware Doctor to be the most effective, and PestPatrol not far behind, but AntiSpyware still has a little way to go before it matures into a must-have program.

Spyware is certainly a rising scourge but no matter how effective and easy to use a single anti-spyware program has not proved effective against all unwanted software, trojans and loggers. We recommend using a few programs in concert with each other.



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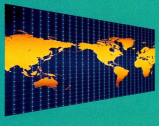
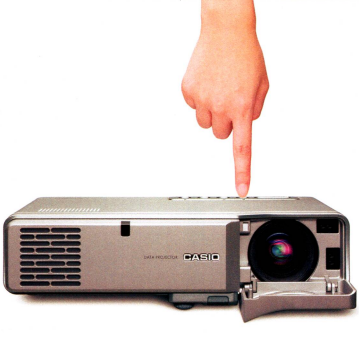


Auto horizontal keystone correction required.

Auto vertical keystone correction required.

Auto focus required.



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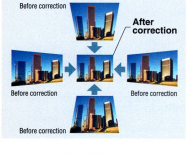

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CASIO COMPUTER CO., LTD.
Tokyo, Japan

AOL BROWSER

PRICE: FREE

LABS VERDICT

AOL puts Microsoft to shame by adding a raft of missing features to Internet Explorer. Looks like Firefox has a serious competitor after all.

PREVIEW

Browsers: turn your back and up pops another one. This time it's AOL, which has been in browser limbo for years. It owns Netscape, yet its online client has an unnatural reliance on Internet Explorer (IE), and if you look closely at the underpinnings of its first standalone browser, you'll find it's built on IE too. It's a double-edged sword, as it's susceptible to the same flaws and hacks as the Microsoft edition, but at the same time will benefit from automatic patches and upgrades through Windows Update. It also addresses many of IE's shortcomings that have left Firefox alone to prosper.

The most obvious one is tabbed browsing, a key selling point for Firefox and Opera. But where Firefox only opens a tab when asked, AOL uses them by default, ignoring tags that pop up new windows and instead showing them in a separate tab in the same browser window. Thumbs up for keeping our Desktops tidy, but it isn't entirely well done, as it leads us on to the first of our two complaints. Spin-off windows are often smaller than the page that spawns them, with designers slipping in lines of code that shrink them to suit the size of their contents. This works great in a standalone window, but when it resizes something in a tab, the whole application contracts. So, when you switch back to one of your full-size pages, you then have to resize the browser. Firefox, on the other hand, ignores these size commands.

Far more irritating, is that opening a regular link in a tab puts the new tab on top. This breaks your flow and you have to click back to the original page. Hopefully, by the time this beta is finished, AOL will realise that we open pages in tabs because we want to read them when finished with the original page.

But that's where the gripes peter out.

▲ AOL Browser's tabbed interface uses thumbnails to aid navigation.

'Pop-up ads are blocked by default, but can be uncovered *en masse* or on an individual basis.'

Not only does this browser look good, it works incredibly well. Pop-up ads are blocked by default, but can be uncovered *en masse* or on an individual basis. A counter on the status bar tallies blocked windows in a far subtler manner than Firefox and post-Service Pack 2 IE.

Hovering over a tab brings up a thumbnail of the page it contains. So does passing your mouse across your Favourites list, and holding your mouse over the forward and backwards buttons not only brings up a list of the pages you've been clicking through, but again pops up an image of each page. It's surprising how far you come to rely on these visual cues – when you switch back to a browser that works on text and icons alone, you quickly start to miss them. Fortunately, a range of footprint-wiping options clear all these thumbnails, and optionally a whole raft of cookies and historical entries, which can save you unnecessary blushes.

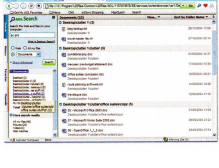
If you're switching from Explorer, your favourites will follow. If you're an AOL member, a single click will even import your bookmarks from the AOL client. When complete, the browser will be available to all and sundry, but it looks like only AOL subscribers will be able to access TopSpeed, a proprietary caching tool that promises to cut download times across both dial-up and broadband links. This wasn't working in our beta code, so couldn't be tested, but what was fully functional was the Desktop Search. This supplements regular web searching on a dedicated toolbar, and the results are truly impressive. Searching can bring up hits in documents, spreadsheets, PDFs and more, regardless of document size. Each of our test results were spot on, despite the fact none of the filenames actually contained our search terms. You'd expect this to take several minutes to complete; yet all told it was finished in less than two seconds. Literally. Indeed, once we'd opened the PDF, it took Adobe Reader far longer to locate our test words than AOL Browser had taken to pull up the file in the first place. As AOL Browser itself is based on IE, the Desktop Search is based on Copernic's Desktop Agent.

This alone is enough to make upgrading a serious option, but it could be the 'Power Browsing' features that swing it for less experienced users. Accessed through a right-click menu, they let you highlight URLs and distinguish between internal and external links, increase the contrast, zoom in and out, and generally enhance the page to improve legibility and overcome visual impairments. Other features focus on security, giving you access to Whois lookups and switching the descriptive text of each link for the physical address of the pages they reference. This might sound like a backwards step, but it does let you see whether a link to your online bank really does go where you expect, and not to a phishing imitation.

About the only thing counting against AOL Browser is the fact it doesn't use the Gecko engine that underpins Firefox and its ilk. For IE die-hards, though, this looks like it's going to be an essential browsing experience.

Nik Rawlinson

▼ AOL's Desktop Search is fast, accurate, and conveniently bundled into the fabric of the browser.



REQUIREMENTS

Pentium; 128MB RAM; 150MB hard disk space; Windows 98 SE onwards.

SUPPLIER

AOL via website

http://beta.aol.com/aolbrowser/index.html

ZABKAT XPLORER2

PRICE: $42 (€24.95)

LABS VERDICT

Plenty of useful features, but some extra thought on usability would be desirable.

Ease of use	★★★☆☆
Features	★★★★☆
Value	★★★★☆
OVERALL	★★★☆☆

The market for Windows Explorer replacements is getting decidedly crowded. Hot on the heels of Directory Opus 8 (*page 63*) comes xplorer2. But where Opus replaces Explorer and pops up when you open My Computer, you have to do some manual Registry edits to achieve the same in xplorer2.

Sadly, it doesn't share all of Opus' features either. Word files don't preview as you'd expect; it's happy enough with RTF, but DOC files are rendered as hex unless you tell Word to save previews. Nor do PDFs preview, and we found no way to predict which Photoshop files would show an image and which as underlying code.

It's not entirely accurate when reporting the size of a network drive either. Our personal share on a 200GB server somehow had 300.2GB free, and connecting to a dead link in My Network Places was enough to freeze it entirely. Opus, on the other hand, always gave us a handy button to abort.

But there's an even easier way to lock yourself out. Every time we copied a well-stuffed folder, our attempts to open other directories were ignored until it had finished writing the files. With folders full of photos, this was several minutes later.

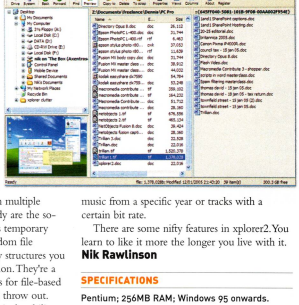
However, there are good points, such as the option to open multiple folders on separate tabs. Also handy are the so-called 'scrap containers' that act as temporary repositories for search results, random file collections and complex directory structures you want to flatten for simple navigation. They're a kind of digital jotter xplorer2 uses for file-based notes that you then screw up and throw out.

Perhaps smartest of all, though, is the ability to search using metadata. So if you've extended Windows Explorer to interrogate the ID3 tags on your MP3s, you can tell xplorer2 to hunt out music from a specific year or tracks with a certain bit rate.

There are some nifty features in xplorer2. You learn to like it more the longer you live with it.

Nik Rawlinson

▶ 645FF040-5081-101B-9F08-00AA002F954E – AKA the Recycle Bin.



SPECIFICATIONS

Pentium; 256MB RAM; Windows 95 onwards.

SUPPLIER

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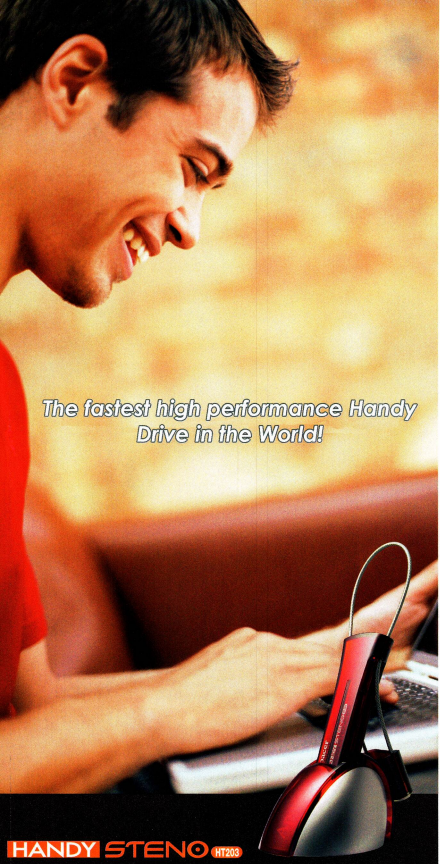

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Want something more than a point-and-click happy snapper? This month we look at serious cameras to give you the professional edge.

There are plenty of digital cameras about the size of a pack of cigarettes, small enough to fit in a shirt pocket to be pulled out for any photo moment. These happy snappers are great for travelling, parties and taking a quick shot here and there, but digital cameras can offer far more for the serious amateur and professional.

The prices and physical size limitations continue to drop, and alongside this shift, we can see huge increases in the amount of megapixel on offer for your dollars, particularly in the professional range. In the last few years we've seen basic five megapixel cameras for under a grand, and now you can pick up good quality seven megapixel cameras for the same price. The rapid uptake of digital SLR bodies with interchangeable lenses means prices have dropped below the $2000 mark and are now within reach of those after quality imaging on a budget.

We put out the call this month for 7 and 8 megapixel digital cameras, both in digital SLR and compacts and we're happy to be able to bring you a smattering of each. The distinct advantage of DSLR is the ability to purchase and use additional lenses specific to your use, whether it be macro, telephoto or fisheye. In Canon's case, for example, the EF and EF-S mount means you can use any standard 35mm analogue film camera lens with your new digital body. While each will produce a different effect depending on your tastes, you're not limited to fixed focus or short focal distance shooting.

We've tested these cameras just the way you're going to be shooting. Using a variety of subjects and lighting conditions, we're sure there's something for anyone looking to buy a camera in the coming pages, so turn to page 80 to see how we ran them through their paces.

TECHNICAL EDITOR: Darren Ellis
STAFF WRITER: Dan Chiappini

REVIEWS

Canon EOS 350D Page 78

Canon Digital IXUS 700 Page 72

Casio Exilim PRO EX-P700 Page 73

Konica Minolta DiMAGE A200 Page 73

Nikon Coolpix 8400 Page 74

Olympus C-70 Zoom Page 74

Olympus E-300 Page 78

Samsung Digimax V700 Page 72

Sony Cyber-shot DSC-V3 Page 77

ARTICLES

Performance analysis Page 80

Feature table Page 82

Memory cards Page 84

SAMSUNG DIGIMAX V700

PRICE: $899

PC AUTHORITY LABS WINNER JUNE 2005

LABS VERDICT

A well-priced digital compact, with all the bells and whistles.

Performance	96	OVERALL
Features	118	
Value for money	126	113

100 is the average

This camera is impossible to go past as our Labs winner this month, boasting good quality images, an excellent range of features, and the second lowest price on show.

Samsung, while not typically thought of as a huge camera market player in Australia, has come out with a dead set corker of a camera, suitable for the happy snapper, semi professional or those after quality photos on a tight budget.

On the feature side, the Digimax V700 boasts JPG, TIFF and AVI support, allowing you to record in multiple formats for different purposes.

It comes bundled with a remote control for taking those group and self portrait shots that are so hard to capture, while the sensibly placed tripod mount thread is handy for users needing to swap out a spare battery or more memory while set – and thus preserving the angle or placement of your subject.

One of the best aspects of this camera is its bundled 128MB SD card, enough for 40 shots in the highest resolution. Its fast system start up means you'll be up and shooting fast enough to capture any moment.

Image quality overall was average, however the natural lighting tests produced some good shots, with very little noise detected on solid colours. The images remained sharp even when zoomed on in software. Colour reproduction in our fluorescent tests were faithfully reproduced, care of the two fluorescent compensation modes, and the chrome displayed very little trace of yellowing. Test shots without flash were a little dark, but we levelled them up without any degradation to the quality of the subject or rest of the shot.

With little significant quality difference in the compact cameras on test here, it comes down to price and features. Here, the Samsung excels and is well-deserving of our Labs Winner award.

CANON DIGITAL IXUS 700

PRICE: $849

PC AUTHORITY RECOMMENDED JUNE 2005

LABS VERDICT

Small, sexy and fast. You'd be hard pressed to find something as small that performs as well.

Performance	104	OVERALL
Features	98	
Value for money	130	110

100 is the average

The second highest performer overall, Canon's offering to the compact digital camera market in the 7-megapixel region is a combination of style, features and photographic quality.

Housed in a brushed aluminium casing, the IXUS 700 looks sleek and sexy, but unfortunately this finish is also its downfall. While it's rugged and ready to take knocks, it has a tendency to scratch with the normal wear and tear of family shooting or travel.

The back of the camera holds the large 2-inch LCD display as well as the mode scroll wheel and other function buttons. Everything is evenly spaced, great for large hands. A flick of the wheel changes to display mode, showing your captured images in all their glory; there's also an integrated histogram so you'll know if you need to re-shoot if your levels are too high or low.

The IXUS was one of only a handful of our test cameras to be supplied with some form of removable memory, in this case a 32MB SD card. Given you won't be able to store many images at the highest resolution on only 32MB, the camera's sub $900 price tag means you can pick up the camera and additional memory for under one thousand dollars.

First in our performance tests, the camera produced excellent quality images. Our Luna Park test subject images came back with accurate colour reproduction. Some solid colours did exhibit noise, so extreme zooming may be better left to other cameras. The indoor images held their own against some stiff competition, producing a good range of colours and gradient without noticeable moire. The florescent lighting compensation did an excellent job, faithfully bringing out the colour of the chrome without yellowing the image as was apparent with some of the other cameras.

Overall, this is a well priced camera with a decent set of features. It won't break the bank and its slim, pocket-sized body and super fast start up time means it makes this a good choice for high-quality shots in a compact.

CASIO EXILIM PRO EX-P700

PRICE: $999

LABS VERDICT

A camera with good results, it's not the cheapest on show, but produces quality images.

Performance	103	OVERALL
Features	86	
Value for money	105	98

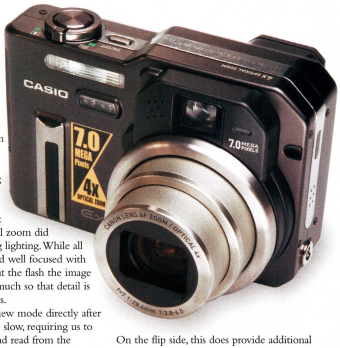
100 is the average

Settling somewhere between Sony's DSC-V3 and Canon's Digital IXUS 700 for size, Casio has managed to fit a lot into a relatively small housing. It weighs in at 264 grams with battery and memory card, although no memory is supplied. This means you're into the $1000 range before you even begin shooting, but it does give you the option of selecting the best sized memory for your intended shooting usage. The EX-P700 also gives you the option of using MMCs rather than being locked to only Secure Digital.

The large LCD display on the rear of the unit makes framing your shot or previewing images a snap, while the live histogram function means you have an indication of how they're going to come out. The classic scroll wheel is used to access the various shooting modes, including video capture. While definitely not a replacement for a stand alone video camera, it is handy for video at a pinch and produces a decent framerate.

Taking second place in our performance testing, it excelled in natural light, faithfully recreating colours, but did slightly over expose brightness. Photos under fluorescent light at maximum optical zoom did a great job compensating lighting. While all the detail was present and well focused with the flash enabled, without the flash the image was incredibly dark. So much so that detail is obscured in our test shots.

Changing to the preview mode directly after taking a photo was quite slow, requiring us to wait while it wrote to and read from the memory. Another major concern for us was the positioning of the tripod thread. Those wishing to mount it may find it awkward as the thread is directly below the lens to counter-balance its weight, instead of the middle of the base.



On the flip side, this does provide additional hand space when it is mounted.

A good quality performer with a reasonable set of features, it's not the best unit on show, but it's a competent shooter if you don't mind paying the asking price.

KONICA MINOLTA DIMAGE A200

PRICE: $1399

LABS VERDICT

Well featured but an average performer, there's better value in the Samsung V700 or Canon's 350D.

Performance	97	OVERALL
Features	103	
Value for money	77	92

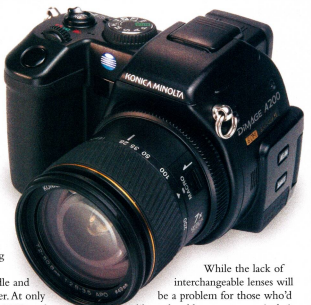
100 is the average

Taking into consideration this camera's performance, feature set and purchase price, the Konica Minolta DiMAGE A200 is unfortunately a tough pill to swallow. Somewhat of a hybrid unit, it looks the SLR part, but body type means you're limited to a fixed lens rather than interchangeable lenses as with the Olympus E-300 and EOS 350D from Canon. The integrated 28-200mm lens should give you enough focal distance to get up close and personal.

The DiMAGE A200 is relatively lacking on the performance front, due mainly to digital noise in the sunlight test shot, even at an ISO rating of 400. The colours are reasonably accurate and vibrant, albeit a bit darker than we would have liked. Indoor shots with and without flash were better, with good image quality and fine details present on both shots, even at a high rate of zoom in software. Unfortunately the fluorescent coloured light compensator yellowed our test subject without flash and a slight magenta tinge was present with the flash enabled.

But, the Konica Minolta scores top marks for its stellar combination of features, placing second behind Samsung's V700. It took a massive value for money hit with its DSLR $1300 pricing. Its feature score of 103 coming care of its range of supported capture formats, software bundle and inclusion of a remote controller. At only $500 cheaper than the Canon 350D and the same price as the body-only offering from Olympus, it's not in the same league despite the cost.

Fifth overall in the compact stakes, quality is less than we would have expected for a camera of this price, although the features help to soften the blow.



While the lack of interchangeable lenses will be a problem for those who'd like to be able to swap to suit their need and subject matter, for what is essentially an SLR style compact, it does a mediocre job and makes us think you're better off either saving money and getting a true compact or paying a little more and going with the Labs winning SLR if you're in the market for a new camera.

NIKON COOLPIX 8400

PRICE: $1599

LABS VERDICT

An average package, but a little too pricey for what it's offering.

Performance	98	OVERALL
Features	98	87
Value for money	66	

100 is the average

Nikon's 8 megapixel offering is a mixed bag of performance and features. Despite being $200 more expensive than the Konica Minolta DiMAGE A200 and the two scoring similarly in our image quality tests, the cheaper Konica won out on features and price, pulling ahead by 5 points.

The Coolpix did quite a good job of capturing both the primary colours of the Luna Park face in our natural light and metallic surfaces in our indoor fluorescent tests with the flash enabled. In natural light at high levels of zoom, we did see a bit of digital noise, a problem given the relatively small 24-85mm equivalent lens found on this unit. This camera also tops out at a 400 ISO rating, making it less suitable than some of the competition for shooting in low lighting conditions as they scale to ISO of 1600.

On the feature side, this camera has a handy rotating LCD display, able to be extended away from the body for self portrait shots or protecting the screen while travelling. Nikon also includes a remote control to make the process even easier. Unfortunately, despite being a fairly large body, the zoom controls are a little hard to reach for people with smaller hands.

We also found that once mounted on a tripod, the battery compartment was inaccessible due to the mounting plate covering the side of the release. This may vary from tripod to tripod, but is none-the-less a problem for those doing long shoots and requiring a change of battery without resetting.

Unfortunately the cost really holds back this camera, finishing in last place. Despite average quality and reasonable features, with such stiff competition, those after an eight megapixel unit with interchangeable lenses would be better suited to the Canon EOS 350D or the Labs winning Samsung for a cheaper fixed lens camera.

OLYMPUS C-70 ZOOM

PRICE: $899

LABS VERDICT

A good all-round performer, this camera offers great value for money.

Performance	103	OVERALL
Features	101	109
Value for money	124	

100 is the average

Missing out on an award by only the narrowest of margins, Olympus' C-70 is a top notch compact digital camera from a brand synonymous with imaging. Not as flashy or thin as Canon's IXUS 700, the C-70 is a little plain to look at, but performs above average on all fronts while still representing great value for money.

Despite the slight contrast over-saturation on our natural light subject, the colours were true and vibrant, and there was only a minor amount of digital noise on the photo – all the hallmarks of a good quality image sensor. Image quality and colour taken under fluorescent lighting with compensation were both good, with fine detail present. The flash image was again slightly over-exposed, but definitely not beyond the realms of a little levelling with software. This camera's strength lies in its sharp images, the minimal noise and minimal chromatic aberrations making it suitable for large scale prints.

Looking at features, the C-70 sports a large 38-190 35mm equivalent zoom, more than enough to get that close up shot from a decent distance.

Olympus also includes a 32MB xD card with the camera.

Like the IXUS 700, it's good to be able to shoot right out of the box, but expect around 20 shots before needing to delete or download the images before you're ready to go again.

The menu system is friendly and easy to navigate, while the zoom controls are within easy reach of the shutter release, making it accessible to any sized hands.

Overall, it's an above average performer with a good range of features and sub $1000 price to match.

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SONY CYBER-SHOT DSC-V3

PRICE: $1499

LABS VERDICT

A relatively high price tag lowers what is otherwise a good all-rounder.

Performance	101	OVERALL
Features	96	
Value for money	72	90

100 is the average

Dead on average in our performance ratings, Sony's Cyber-shot DSC-V3 produced reasonably good pictures, although noise was present in both the outdoor natural light shot and indoor fluoro shots. There were also signs of chromatic aberrations; while the brightness levels left a little to be desired – again a little levelling with software fixed the problem with brightness. The colour reproduction was good, with blues coming out deep, and yellows and reds vibrant. Indoor flash and flash-suppressed photos showed traces of noise, although the chrome gradient was smooth and absent of moire.

On the feature front, Sony's weighty 404g camera, including CF card and battery, makes it the second heaviest compact digital camera. The grip is comfortable, even for larger hands and helps to shift the weight away from the fingers.

Our tripod mount plate again slightly overlapped the memory and battery release cover, meaning you'll need to remove it from its stand in order to swap out parts.

Unlike some of the older Sony models, the DSC-V3 supports Compact Flash and Memory Stick cards, allowing you to store both at the same time and swap using a switch located just right of the LCD.

The display on this camera is huge, the largest on show, topping 2.5 inches and giving you great shot previews and frames.

Unfortunately, it's priced more in the digital SLR realm, rather than the compacts on offer here. If you're willing to pay this amount of money, for quality you may want to look at our cheaper Labs winning Samsung or for more lens options, Canon's EOS 350D.

MEMORY CARD READERS

LABS VERDICT

SANDISK PHOTO ALBUM

PRICE $95

SUPPLIER

Bright Point (02) 9485 1111

www.brightpoint.com.au

OVERALL ★★★★★☆

SWANN 11-IN-1 MEMORY CARD READER

PRICE $49.95

SUPPLIER

Swann (02) 4388 3558

www.swann.com.au

OVERALL ★★★★★☆

SANDISK PHOTO ALBUM

Digital photography's wildfire-like spread in popularity has put the products through a rapid evolution. Consequently cameras now have removable memory, allowing you to shoot, pop out the card, drop in another one and keep going without breaking pace.

Sandisk combines the ease and use of a removable memory card reader for all common flavours of cards and a device which integrates with your home entertainment gear for easy picture showing.

Plug the device into the AV inputs on your television, put in your memory and fire it up. It'll even auto-resize the image for you if you choose to rotate your pictures. There's also the option to add music from your collection to play alongside your slideshow.

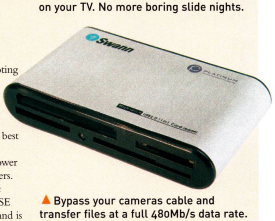
Unfortunately format support is a little limited with the device only able to read JPEG, Motion JPEG and MPEG-1, meaning you'll need to reformat TIFFS, AVIs or RAW photos to play. For the cost though, this is a great little device for happy snappers and those wanting to share their photos.

▲ Use the included remote control and a range of transitions to show your photos on your TV. No more boring slide nights.

SWANN 11-IN-1 MEMORY CARD READER

Photos by nature are a portable way of recording important events. If you're shooting a lot your only options are to either buy a large capacity flash memory card, multiple cards or to download photos often. Swann comes to the party with an 11-in-1 card reader to cover all bases and best of all, it costs less than $50. The reader is powered by USB, so you won't need a power supply, making it perfect for notebook users.

This reader also spans the PC and Mac market gorge by supporting Windows 98SE through to XP and OS X 10.2 onwards and is perfect for both camps.



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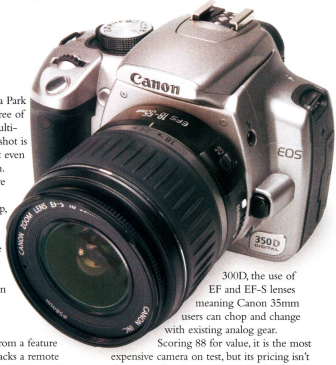
Digital SLRs head-to-head

Do you need digital SLR? We put Canon and Olympus head-to-head.

CANON EOS 350D

PCAUTHORITY RECOMMENDED JUNE 2005

PRICE: $1899 starter kit



LABS VERDICT

Relatively pricey, but it's the best quality camera on test.

Performance	108	OVERALL
Features	100	
Value for money	96	101

100 is the average

Unrivalled for quality, Canon's EOS family name has typically been well-received. Synonymous with quality 35mm analog equipment, the release of the hugely popular EOS 300D opened the door for a quality digital SLR under $2000. The 350D builds on this legacy, ramping from 6.1 to 8 megapixels, tweaking the function controls, and shrinking the body.

Although housed in silver plastic, the unit feels robust and sturdy. While pushing towards the upper echelons of the professional market, being able to keep the unit's cost at less than two thousand dollars still makes it accessible to consumers without blowing the bank.

Eight points above our average, our outdoor Luna Park shots are almost entirely free of digital noise, while the multi-spot metering means the shot is well focused and usable at even 200 percent magnification.

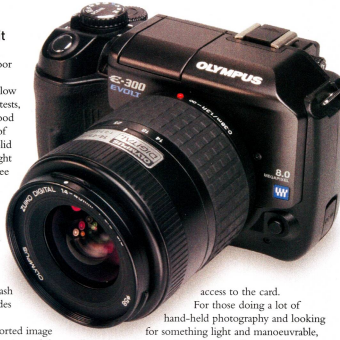
Indoor flash results were definitely the most impressive in the round up, completely removing the presence of fluorescent lighting. It maintained the tones and gradient of the chrome without over exposure. Flash suppression again highlighted detail without over-saturating the subject.

A little disadvantaged from a feature point of view, the 350D lacks a remote control, and misses out on TIFF recording. However, a remote controller is available as an optional accessory. The starter pack ships with the 18-55mm all purpose lens common to the 300D, the use of EF and EF-S lenses meaning Canon 35mm users can chop and change with existing analog gear.

Scoring 88 for value, it is the most expensive camera on test, but its pricing isn't the main seller for the 350D. This baby is all about quality, and it's here that it wins our Recommended Award. The quality of this camera is simply one of the best we've seen.

OLYMPUS E-300

PRICE: $1399 body only; $1599 starter kit; $1899 power kit



LABS VERDICT

Strong but bulky, it excels in natural light while the Power Kit should keep you up and shooting all day.

Performance	92	OVERALL
Features	100	
Value for money	104	99

100 is the average

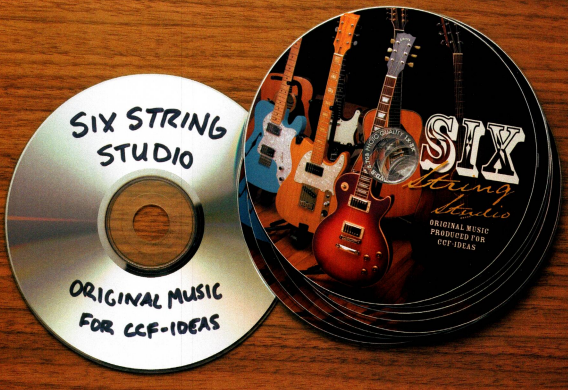
The heaviest camera we received in the roundup, the E-300 weighs in at just over a kilo and certainly gives the impression of being sturdy and solidly built. The weight may get a little rough on the arms after doing extended hand-held shooting, but if you like the feel of a solid unit you definitely won't be disappointed.

Much like the true digital SLR body, the E-300 is available in three different configurations: body only, body with 28-90mm lens, and the E-300 power kit comprising the 28-90mm lens with an additional battery and vertical grip. The standard kit also features a lens hood for blocking out light when shooting in bright outdoor conditions.

Although it scored below average throughout our tests, the image quality was good with only minor traces of noise apparent on the solid colours of our natural light test. Despite offering three fluorescent lighting compensation options, the best option still turned our photos a shade of pink. The detail was very sharp and chrome gradients were accurate, but the discolouration in both flash and flash suppressed modes was disappointing.

A wide range of supported image storage formats is encouraging, while a well-placed centre mounted tripod thread means you can easily remove your battery mid-shoot. The side-mounted CF slot allows for easy access to the card.

For those doing a lot of hand-held photography and looking for something light and manoeuvrable, this may not be the camera for you. For those after a solid unit destined for a tough life, this one should wear the knocks quite well and take good photos to boot.



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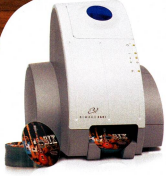

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Performance Analysis

We've burnt through rolls and rolls of virtual film to bring you the lowdown on 7 and 8 megapixel digital cameras.

We test a lot of gear here at *PC Authority*. Most of our testing involves components or systems which can be run through their paces using synthetic and real world benchmarks to put out a quantifiable result. Testing digital cameras is a very different process – histograms, weighted means and spreadsheets won't tell you whether a camera will take high quality shots. The best way one can test a digital camera is simply by taking a lot of photos, then judging the outputs. So with this in mind we armed ourselves with our trusty tripod, picked up a stack of flash memory and went out to take a bunch of pictures.

INDOOR PHOTOS

A large percentage of the photos taken on digital cameras are indoor shots, and as such most users will encounter the drama that is shooting under fluorescent lighting.

These are the sorts of demanding positions posed to all photographers no matter how good their equipment is.

To suitably test the functions of the cameras, we put each into the manual mode, set the ISO to 400 and enabled noise and lighting correction white balance. In the instance where multiple modes were available, we shot with each mode and selected the closest to the goal. We set up our tripod on the desk to ensure the photo was taken from an identical position on each camera. This ensured the angle, degree of rotation and distance from the subject was the same across the board. Each camera was then zoomed to its maximum optical zoom on the target and the shutter released.

We chose a metal figure of everyone's favourite alien, the Predator, because it gives us a way of analysing several different elements from one photo. Not only is it a detailed subject, but chrome is very hard to shoot well. This gives lets us test default white balance and potential moire patterns of poor gradient and tonal change. We shot with and without the flash.

▲ Canon EOS 350D

▲ Canon Digital IXUS 700

▲ Casio Exilim PRO EX-P700

▲ Konica Minolta DiMAGE A200

▲ Nikon Coolpix 8400

▲ Olympus C-70 Zoom

▲ Olympus E-300

▲ Samsung Digimax V700

▲ Sony Cyber-shot DSC-V3

OUTDOOR PHOTOS

Given that many of the photos taken using these cameras will be outdoors, our natural light test gives an indication of exactly how these cameras will perform shooting in the real world. And what better test subject than one of the most famous faces in Australia? The face of Luna Park covers a few of the most crucial elements of photography, using primary colours, natural lighting and shadow.

We shot all of the cameras on the same tripod over a period of fifteen minutes to ensure similar lighting conditions. Daylight also highlights problems which may occur, such as chromatic aberration (coloured fringing) and barrel distortion. Note that the scene did change slightly throughout testing, however each camera was scored with this in mind. The results here represent a smal subsection of the total image.

SCORING

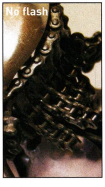
Once returning to the Labs we uploaded the images and scrutinised them, giving each a score out of ten per test. These include: colour, contrast, brightness and clarity.

We've also rated each camera on a feature basis, taking into account software bundles, accessories, memory, weight and supported file formats.

Once we've totalled the scores we then convert them into a weighted score, with 100 being the average. This month we've weighted them to the tune of 60 percent performance and 40 percent features as the units are targeted towards a semi-professional and enthusiast market. We've taken into consideration value for money and calculated a final overall score; units scoring over 100 excel in their field and awards have been given accordingly.

We've separated the units so that compacts compete against compacts and SLRs compete with other SLRs. This is so value for money scores aren't skewed when taking into consideration price and performance for our overall score.

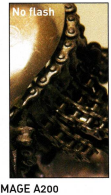
As you'll see from our test photos, the cameras performed very differently in the three tests. Where cameras such as Casio's Exilim PRO EX-P700 performed well in natural light, but suffered when shooting in low lighting conditions. Our awards have been awarded to the units we think offer the best of each of our quality, feature and value for money scores. Canon's EOS 350D is an example of this, where despite taking excellent quality images, the comparatively lower feature set and high price denied it an award.



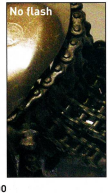
▲ Canon EOS 350D

▲ Canon Digital IXUS 700

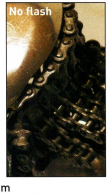
▲ Casio Exilim PRO EX-P700



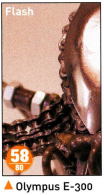
▲ Konica Minolta DiMAGE A200



▲ Nikon Coolpix 8400



▲ Olympus C-70 Zoom



▲ Olympus E-300

▲ Samsung Digimax V700

▲ Sony Cyber-shot DSC-V3

	CANON EOS 350D	CANON DIGITAL IXUS 700	CASIO EXILIM PRO EX-P700	KONICA MINOLTA DIMAGE A200	NIKON COOLPIX 8400	OLYMPUS C-70 ZOOM	OLYMPUS E-300	SAMSUNG DIGIMAX V700	SONY CYBER-SHOT DSC-V3
Price	$1899 starter kit	$849	$999	$1399	$1599	$899	$1399 body only; $1599 starter kit; $1899 power kit	$899	$1499
Supplier	Canon 13 13 83	Canon 13 13 83	Hagemeyer (03) 9370 8888	Konica Minolta 1300 368 930	Maxwell 1300 366 499	Olympus 1300 659 678	Olympus 1300 659 678	Adeal (03) 8369 4444	Sony 1300 137 669
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Warranty	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year	1 year
BASIC SPECIFICATION									
CCD resolution (megapixel)	8.0	7.1	7.2	8.0	8.0	7.1	8.0	7.1	7.1
Max optical resolution	3456 x 2304	3072 x 2304	3072 x 2304	3264 x 2448	3264 x 2448	3072 x 2048	3264 x 2448	3072 x 2304	3072 x 2304
Maximum ISO rating	1600	400	640	1600	400	400	400	400	800
Focus method (auto; manual)	auto; manual	auto; manual	auto; manual	auto; manual	auto; manual	auto; manual	auto; manual	auto; manual	auto
Macro mode	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Variable focal length (35mm equiv.)	28–90	37–111	33–132	28–200	24–85	38–190	28–90	38–114	34–136
Video output	NTSC; PAL	NTSC; PAL	NTSC; PAL	NTSC; PAL	NTSC; PAL	NTSC; PAL	NTSC; PAL	NTSC; PAL	NTSC; PAL
Standard tripod thread	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions W x H x D (mm)	126.5 x 94.2 x 64	89.5 x 57 x 26.5	97.5 x 67.5 x 45.1	114 x 80 x 115	113 x 82 x 75	102 x 59 x 42.5	146.5 x 85 x 64	105.5 x 54.6 x 38	119.8 x 72 x 63
Weight including battery and memory (grams)	746	194	264	590	498	258	1004	182	404
Carry case	No	No	No	No	No	No	No	Yes	No
Lens cover	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Flash	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Redeye reduction	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MEMORY									
Technology	Compact Flash Type I and II	Secure Digital	Secure Digital; MultiMedia Card	Compact Flash Types I and II; Microdrive	Compact Flash Types I and II; Microdrive	xD Picture Card	Compact Flash Types I and II; Microdrive	Secure Digital; MultiMedia Card	Memory Stick; Memory Stick PRO; Type I Compact Flash
Memory supplied	None	32MB SD	None	None	None	32MB xD card	None	128MB SD	None
Burst capture	3fps	2fps	3fps	2.3fps	2.3fps	2.2fps	2.5fps	Not supplied	2 frames/sec
CONTROLS									
Optical viewfinder	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LCD monitor size	1.8in	2.0in	2.0in	1.8in	1.8in	2.0in	1.8in	2.0in	2.5in
Separate status LCD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Self timer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
POWER									
Battery pack	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion	Lithium-Ion
AC adaptor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CONNECTIVITY									
PC connection type	USB	USB	USB	USB	USB	USB	USB	USB	USB
File format	JPG; RAW	JPG; AVI	JPG; AVI	JPG; RAW; MOV	JPG; TIFF; RAW; MOV	JPG; TIFF; RAW; QuickTime Motion JPEG	JPG; TIFF; RAW	JPG; TIFF; AVI	JPG; TIFF; RAW; MPEG
PictBridge support	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote control	No	No	No	Yes	Yes	No	No	Yes	No
Editing software supplied	Image Browser 5.1; Digital Photo Professional 1.6; EOS Capture 1.3; PhotoStitch 3.1	ZoomBrowser EX 5.1; PhotoRecord 2.2; PhotoStitch 3.1; Arcsoft PhotoStudio 5.5	Photo Loader 2.2; Photohands	DIMAGE Viewer; ULEAD Video Studio 8 SE	PictureProject 1.0	Olympus Master Software	Olympus Master Software	Digimax Viewer 2.1; Digimax Reader	Image Data Converter 2.2; Picture Package 1.1; ImageMixer VCD2
Other software	Arcsoft PhotoStudio 5.5								

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Memory Cards

With the enormous variance in 'digital film' prices, we find out which are the best performers and which offer the best value.

Buy any digital camera these days and you'll find a paltry 16MB or 32MB memory card in the box. With megapixel ratings soaring, you'll be able to take only a few images before these cards fill up.

But before you rush out and buy a high-capacity card from your local retailer, don't think that all memory cards are created equal. Indeed, a brief wander through the local shopping centre revealed the price of 128MB Secure Digital (SD) cards ranges from $39 to $100. The good news is that it's much cheaper to buy online.

It's important to remember that price isn't the only factor to consider. Most brands offer various speeds of media too. High-speed media will mainly benefit photographers with high-end cameras. Despite the latest models having large memory buffers, the media cards need to have fast write speeds in order to allow the buffers to empty quicker, and thus allow photos to be taken at a faster rate. Some companies charge significantly more for such media, so make sure you really need the extra speed before shelling out.

We've tested 20 different media cards to find out which offers the best combination of speed, value and capacity. Using a USB 2 card reader we transferred 110MB of photographs, including a 60MB TIFF and a selection of compressed JPEGs, to and from each memory card to test the write and read speeds respectively. Arguably, write speeds are more important since you don't want to miss the moment when you're out and about. Read speeds, which affect playback speed across different devices and transfer times onto your PC, aren't so critical.

On the opposite page, you'll see our results (ordered with the highest write speeds at the top of each format) along with R.R.P.'s prices for the entire range of capacities offered. If you can't afford the biggest, fastest card, it isn't hard to find a combination of price, performance and capacity to suit you.

SD/MMC

At present, most consumer digital cameras and PDAs use Secure Digital cards and MultiMedia Cards (SD/MMC). The former differ in that they're generally faster, more expensive, offer a write-protect switch and copywriting abilities. Other than that, the two are interchangeable.

Capacity is constantly increasing but is still behind the much larger CompactFlash (CF) cards. IDG research commissioned by SanDisk projects that SD and the newer mini-SD will be the dominant format by 2006, due largely to the growth in multimedia mobile phones and the increased requirement for music, picture and video storage.

Our results show that they offer the best combination of speed and value on the market – though the current 1GB ceiling may be limiting for some. SanDisk's Ultra II card is clearly the fastest, but Lexar offers a great range of price and capacity options. Of particular interest is Lexar's mini-SD card, which comes with a full-size SD card adaptor: it's fast, cheap and offers decent future-proofing. However, the best value comes from Lexar's standard SD range – the cards are as quick as the nominally high-speed ones, are cheaper and the only limitation is the lack of a 1GB option.

COMPACTFLASH

CompactFlash is now almost exclusively used by higher-end digital photographers. With 6-plus-megapixel digital cameras now common, there's a real benefit to having several gigabytes of storage for uncompressed shots. In our tests, Lexar again reigned supreme, with excellent speed coming from an entire range that spans $39.99 for a 128MB CF card to $2930 for a whopping 8GB Professional version.

MEMORY STICK

Memory Sticks are almost exclusively the realm of Sony. PRO versions are faster and Duo versions are smaller in size physically. The might of Sony ensures the format's longevity but it isn't set to grow like SD. However, IDG projects that Duo cards will become the second-most dominant cards, again because of mobile phones. In our tests there was little to separate different manufacturers and they all proved slower and more expensive than SD/MMC and CF. Overall, the PRO Duo proved the fastest, but others are worth considering if you find them cheaper.

XD-PICTURE CARD AND SMARTMEDIA

The final format, xD-Picture Card, is an update to the SmartMedia card – a pioneer in the memory card market but too big and too fragile by current standards. Fujifilm and Olympus use xD-Picture Cards, so there's serious photographic backing.

In our tests the SmartMedia card was slightly faster at writing, but otherwise the overall speed of the format is miles behind the competition. We couldn't find any xD-Picture Cards larger than 512MB and there were only three different varieties to choose from. Fujifilm's cards proved the quickest at reading, but write speed was the same across all three brands tested.

	WRITE SPEED MB/s	READ SPEED MB/s	8GB	4GB	2GB	1GB	512MB	256MB	128MB	Website
SanDisk Ultra II SD	6.5	2.9	N/A	N/A	$359 ($500)	$183 ($260)	$105 ($150)	N/A	N/A	www.digitalcamerawarehouse.com.au
Lexar SD	5.5	3	N/A	N/A	N/A	$133 ($189.99)	$97 ($109.99)	N/A ($69.99)	N/A ($49.99)	www.techbuy.com.au
Lexar High-speed 32x SD	5.5	3	N/A	N/A	N/A	$153.10 ($209.99)	$106 ($129.99)	$71 ($89.99)	N/A	www.techbuy.com.au
Lexar Mini-SD	5	3	N/A	N/A	N/A	N/A	N/A	N/A	$33.90 ($49)	www.techbuy.com.au
SanDisk SD	2.4	3.4	N/A	N/A	N/A	$149 ($210)	$89 ($115)	$59 ($75)	$35 ($50)	www.digitalcamerawarehouse.com.au
Kingston SD	1	3.8	N/A	N/A	N/A	$132.90 ($159.95)	$72.60 ($99.95)	$50.05 ($59.95)	$28.60 ($39.95)	www.techbuy.com.au

Sony Memory Stick PRO Duo	0.9	1.4	N/A	N/A	N/A	N/A	$168.99 ($168.99)	$90.44 ($109)	N/A	www.buyquick.com.au
Lexar Memory Stick	0.8	1.1	N/A	N/A	N/A	N/A	N/A	$99.95 ($99.99)	$52.95 ($69.99)	www.expansys.com.au
Sony Memory Stick Duo	0.8	1.4	N/A	N/A	N/A	N/A	N/A	N/A	$45.60 ($78.99)	www.buyquick.com.au
Sony Memory Stick PRO	0.7	1.4	N/A	N/A	N/A	N/A	$154 ($168.99)	$108 ($109)	N/A	www.ramcity.com.au
Sony Memory Stick	0.7	1.1	N/A	N/A	N/A	N/A	N/A	$131.20 ($159.01)	$65.60 ($78.99)	www.buyquick.com.au

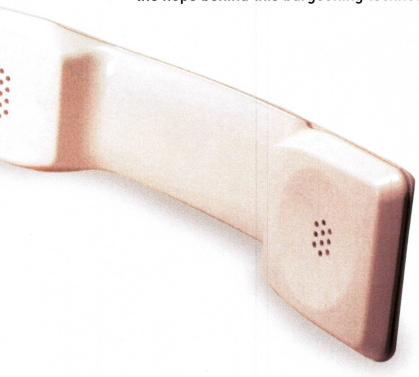
Fujifilm xD	0.3	2.4	N/A	N/A	N/A	N/A	$135 ($160)	$88 ($100)	$55 ($60)	www.digitalcamerawarehouse.com.au
Olympus Camedia xD	0.3	1.7	N/A	N/A	N/A	N/A	$135 ($179)	$88 ($119)	$55 ($69)	www.digitalcamerawarehouse.com.au
Lexar Olympus xD	0.3	1.7	N/A	N/A	N/A	N/A	$148.95 ($199.99)	N/A ($119.99)	N/A ($79.99)	www.techbuy.com.au

Lexar Professional CF 80x	3.5	2.6	2247 (2929.99)	715 (919.99)	N/A ($429.99)	N/A ($209.99)	N/A ($129.99)	N/A	N/A	www.ramcity.com.au
Lexar High-Speed 40x	3.1	3.2	N/A	N/A	N/A	$136.40 ($199.99)	$81.85 ($119.99)	N/A	N/A	www.techbuy.com.au
SanDisk Ultra II CF	2.3	2.1	N/A	N/A	$325 ($475)	$165 ($245)	$105 ($145)	$55 ($75)	N/A	www.digitalcamerawarehouse.com.au
Kingston Elite Pro CF	2.2	2.1	N/A	$499 ($749.95)	$250 ($399.95)	$130 ($159.95)	$75 ($99.95)	$59.95	N/A	www.digitalcamerawarehouse.com.au
IBM Microdrive	2.2	2.3	N/A	$477.48 ($699)	N/A	N/A	N/A	N/A	N/A	www.e-shop.com.au
SanDisk CF	2	2.1	N/A	N/A	$259 ($380)	$135 ($195)	$79 ($115)	$49 ($65)	$35 ($50)	www.digitalcamerawarehouse.com.au

Non bracketed prices denote cheapest online price found, while prices in brackets denote RRP.

The Vocal Majority

The *PC Authority* Labs team clears away the confusing hype of internet telephony to unveil the hope behind this burgeoning technology.



REVIEWS

Voice over IP

Broadband Phone BBP Global	95
BroadBand Phone IP network phone	90
Chat-Cord	97
engin Voice Box	101
engin XPro	92
Firefly	89
Let's Chat IP Phone	95
MailVoice	101
MyNetFone	88
Netcomm V40 USB VoIP handset	98
Netgear Broadband Voice Adapter TA612V	98
Octtel VoIP Gateway	96
Skype	92

Video conferencing

CUworld	104
eyeBeam	104
iVisit	104
Logitech QuickCam Pro 4000	105
MSN Messenger 7	104
Sony PCS-TL50 Video Comms System	105
Swann Max-I-Vision USB 2.0	105
Webex	104

ARTICLES

Introducing VoIP	88
VoIP product and pricing plans table	88
Normal phone prices	101
Spit and spam	102
Video conferencing	104

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CONTRIBUTOR: Ty Pendelbury

Introducing VoIP

VoIP is widely hyped as promising huge savings for the household with exceptionally cheap (and free) international and local calls. We delve into the machinations of the technology.

There has been some truly outstanding coverage of VoIP (Voice over IP) in the past year from the non-technical mainstream media, including many examples of spectacularly overblown and hysterical claims of free phone calls to anyone, anywhere, anytime. Never pay for a phone call again! Find out what the telecommunications giants don't want you to.

Manic claims and statements like these guarantee plenty of airtime and column inches, but while the free-ness of VoIP calls is not exactly true it's not entirely off the mark either. The big telcos such as Optus, AAPT, Orange and everyone's favourite whipping-boy Telstra *should* be concerned about VoIP, especially now it's about to truly enter the consumer market.

It's a new technology and one fully deserving of hype and hyperbole, but at least with this guide you'll be able to see beyond the flashy advertising and marketing hype and will be able to divine the truth of what VoIP is, and most importantly, what it is not. We've traversed the acronym laden landscape of VoIP for you, and present you with the PC Authority guide to VoIP: what it is, what kinds of services you can find, what savings you can expect to make and how it is that you can go about setting up VoIP for yourself at home.

'Voice over IP summed up in a short sentence: VoIP lets you make phone calls over the internet.'

As well as VoIP, we've also taken a look at some of the latest video conferencing products available. Why settle for just voice when you can have video as well?

Voice over IP summed up in a short sentence: VoIP lets you make phone calls over the internet.

It's obviously a much more complex technology than that, but in its simplest form that's exactly what VoIP is.

When a VoIP system is working well you'd never know whether the handset you're picking up is connected to a POTS (plain old telephone system) or whether it has a VoIP connection. The only hints would be the Ethernet cable coming out of the phone instead of the thinner phone line and a potentially degraded signal. Where all of the VoIP hullabaloo comes from is that while your phone call's traversing the internet, you're paying extremely little for it, as opposed to the costs incurred when communication over the same distance on a regular telephone network.

For instance an international call to Bob in America from Alice in Australia would go like this:

Phone

Alice dials international number ➞ phone call is routed from Alice's house to local exchange ➞ it's then routed from local to international exchange from Australia to America ➞ once in America the call is routed back to a local exchange in Bob's locale ➞ exchange connects call to Bob's phone, creating an all-phone line link between the two handsets.

The same call on VoIP

Alice dials international number ➞ phone call is routed over the internet to Bob's location in America ➞ American VoIP server coverts Anne's VoIP call to a local phone call to Bob's phone, creating an internet/phone hybrid link between the two handsets.

There's nothing new in this approach. Discount cards for international calls at cheap rates have been available for years, and do a similar thing, but it's the rise of VoIP for the home that we're really interested in.

The advantage of the VoIP call is that the majority of it is free, and it's only when the border between the internet and the phone system is crossed that the majority of the call costs are incurred.

THERE IS NO SUCH THING AS A FREE LUNCH

The old maxim applies to VoIP, but while there's no free lunch there is an extremely cheap lunch – if you shop around. And also while the hyperbole surrounding consumer VoIP promised free phone calls, this isn't exactly a fairphy – *some* phone calls on VoIP networks are 100 percent free, but not all.

So what's free? Depending on the service you sign up with, usually you'll find VoIP-to-VoIP calls are free. More often than not this depends on whether you're both using the same VoIP service and provider, but it makes national and international VoIP calls either exceptionally cheap, or entirely free. This is perfect for travelling business people, remote offices or for distant loved ones and friends. Plus you can set up conference calls and groups, all chatting away for free.

Please note: that although we say *free*, there is a cost to the internet component of a VoIP phone call. This is reflected in the upstream and downstream data that the

MYNETFONE

Type: VoIP service with ATA
Web: www.myfone.com.au
Price: $149 plus monthly charges

Like most ATA-inclusive services it requires an additional router, but it's very easy to setup: plug the V-100 into the router, install the software and it's ready to go. There's no need to dial international +61 codes for local numbers – it works like a normal phone. Voice quality is very good, and echoing and delay was kept to a minimum. A great option for people wanting to replace their phone service with a cheaper alternative.

▶ We've come a long way – though we'd still like to see more wood finished hardware.

phone call generates, and this is usually subsumed as part of your monthly broadband download cap. And although VoIP calls do add to the amount of data sent and received from your machine, for the purposes of this feature we'll continue to refer to that internet component as free.

So if the true internet calls are free, what isn't? The calls that aren't free on VoIP are those made to landlines or mobiles, and calls from landlines and mobiles to VoIP. However, since the majority of these calls are conducted over internet gateways the actual call costs are reduced. Much in the same way that dial-up internet connections mean only a local call, so to can an international phone call on VoIP consist of a local phone call (usually at the receiver's end) with internet in between.

The other savings come from no longer having to pay monthly phone rental costs (depending on service chosen), lower service charges, lower or non-exisitent call flagfalls and much reduced PSTN call costs. We'll look deeper into these savings further on, but suffice to say that your monthly bills will drop considerably when you make the switch to VoIP.

So here's what you need to consider if making the move.

'The calls that aren't free on VoIP are those made to landlines or mobiles, and calls from landlines and mobiles to VoIP.'

HARD CALLS TO MAKE

Setting up VoIP at home is now easy and painless with many vendors supplying plug-and-play devices or with simple installation wizards, but before you even start there are a few different ways of connecting to VoIP and each is worth considering.

Firstly, and apologies to those in regional areas, you require a broadband connection.

While most voice calls on VoIP are modulated in bitrate and quality depending on the connection speed to keep the required bandwidth low, you still do require broadband at least to get the most out of VoIP.

Secondly, you need to decide whether you want to use your PC as the centre of your VoIP experience or not, as there are hardware (standalone) and software-based (PC reliant) options available. We'll cover PC-centric services below (see: *Soft serve phones*), so assuming you don't want to use your PC for VoIP, then the second must-have requirement is a router or switch with DHCP capabilities.

In a simple set up you have your PC and your VoIP adaptor each connected via Ethernet to your router, which is connected to your ADSL, cable or wireless modem. The important part is the DHCP on the router – without it the VoIP hardware won't work.

With a hardware setup you bypass the PC altogether, as the VoIP hardware connection goes from the router to the modem and then to the internet.

The third consideration in setting up the hardware is how you want to go about setting up the VoIP phone.

There are two options here. You can buy a full VoIP phone handset which looks like a normal telephone but has an Ethernet port and all the smarts built in, or if you already own a POTS (plain old telephone system) handset you can get a VoIP ATA (analog telephone adaptor) box which adapts your phone for VoIP.

An advantage to this hardware is that aside from the initial configuration it's totally PC-independent. You could have the phone in another room (if you've a long enough Cat5 cable), or even in another building entirely using VoIP over a VPN connection.

If you've already got a POTS handset then the ATA option is by far the cheaper one, but cheaper still is foregoing hardware altogether and using a software VoIP service.

SOFT-SERVE PHONES

Where a hardware product like a full handset or an ATA adaptor keeps VoIP toward the POTS landline side of things, using a software-based VoIP service leans more toward the videoconferencing/instant messaging side. Which you choose depends on what you're comfortable with.

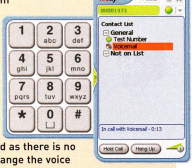
Softphones are literally phones created from software, and they run as an app on your PC or notebook. More often than not they actually feature a graphical representation of a phone in the interface, but your calls are conducted with devices plugged into the speaker and microphone ports on your soundcard, or are

FIREFLY

Type: Softphone
Web: www.freshtel.com
Price: Free download

Not nearly as flexible or as friendly as Skype, Firefly is nonetheless an extremely easy to use program.

The voice quality depends heavily on your connection speed as there is no option available to change the voice codec. Even though we were using broadband connections at each end we were still able to hear an echoing effect. The program's not a bad free intoduction to VoIP though.



BROADBAND PHONE IP NETWORK PHONE

Type: VoIP service with IP phone
Web: www.broadbandphone.com.au
Price: $199 plus monthly charges

The next step up from an ATA is to have a phone which plugs directly into your network. The IP Network Phone is a caller ID unit with built in speaker phone and plenty of onboard features. There is a noticeable delay when using the service, as with many VoIP solutions, but the biggest advantage is the phone is preconfigured with the phone number so it's truly plug and play.

routed via USB. There are lots of further hardware options for softphones, such as handsets that plug directly into the speaker and microphone ports on your system, handsets that use USB, headsets that use either, or you can even rig up a Bluetooth adaptor with a hands-free headset so you can roam about the room.

The drawback of softphones is that you slave yourself to your system when making and receiving calls, but it's much cheaper than buying a VoIP handset particularly if your machine's already kitted out with a headset, speakers and microphone.

Most softphone software also works like an instant-messaging buddy list too, allowing for one-to-one and one-to-many conference calls. Services such as Skype are free to download and use too, but extra options such as voicemail cost money.

There are two final considerations, regardless of whether you take the hardware or software route. The first is that most basic VoIP services are set up mainly for outgoing calls only. With VoIP you have two potential identifiers for your handset/account. One's a code like an IP address, the other's a phone number.

With the basic services you usually have the code which is recognisable by other VoIP services and still allows outgoing calls, but it's unrecognisable by landline or mobile users to return calls.

For this you need a phone number, and getting a phone number is are where VoIP costs are mostly incurred. This is because the VoIP service provider must allocate a number to you and it costs them to get these numbers from the major telcos.

It's the same with free softphone services such as Skype – if you want to allow incoming landline calls, you have to pay up.

Fortunately this number rental is not that much and *still* remains cheaper than leasing a landline.

ARE YOU BEING SERVED?

The final consideration with VoIP is ▶

Company Name	AlphaNet	Australia IP Telecom	BroadBand Phone	AstraPhone
URL	www.siphone.com.au	www.australiaip.com	www.broadbandphone.com.au	www.astratel.com.au
Metro coverage	Global	Nationwide	Nationwide	Nationwide
Plan A	Basic Membership	AIP GlobalCall	BBP Plug'n'Play	Premium Plan
Installation/hardware costs	None	None	$199.00	None
Prerequisites	Broadband	Broadband	Broadband	Broadband
Local call costs	1c per minute	16c	15c	Unlimited
Intercapital city	1c per minute	8c per minute	10c per minute	Unlimited
National call costs	1c per minute	10c per minute	10c per min	Unlimited
International call costs	From 4c per minute (Hong Kong free)	From 2c per minute	From 5c per minute	Unlimited to 13 countries/ 2.9c per minute to others
Call to mobiles	25c per minute	50c per minute	30c per minute	29.9c per minute
Flag fall	None	None	None	None
Monthly fee	$0	$13.80	$15.95	$39
Direct In Dial number	Optional - $7 per month	Yes	Yes	Optional - $5.99 per month
Call waiting	No	No	Yes	Yes
Caller ID	No	No	Yes	Yes
Voicemail	Yes	Yes	Yes	No
1300 & 000 number support	Yes	Not specified	Yes	No
Contract options	No contract	No contract	No contract	No contract
Plan B (if available)	N/A	AIP FreeCall	BBP Global	Basic Plan
Installation/hardware costs	N/A	None	None/$40 with handset	None
Prerequisites	N/A	Not specified	Dialup/ADSL	Broadband
Local call costs	N/A	16c	5c per minute	10c
Intercapital city	N/A	8c per minute	5c per minute	10c
National call costs	N/A	10c per minute	5c per minute	10c
International call costs	N/A	From 2c per minute	From 5c per minute	From 2.9c per minutes
Call to mobiles	N/A	50c per minute	30c per minute	29.9c per minute
Flag fall	N/A	None	None	None
Monthly fee	N/A	None	None	$9.95
Direct In Dial number	N/A	No	No	Optional/$5.99 per month
Call waiting	N/A	No	No	Yes
Caller ID	N/A	No	Yes	Yes
Voicemail	N/A	No	Yes	No
1300 & 000 number support	N/A	Not specified	No contract	No
Contract options	N/A	No contract	No contract	No Contract

NOTE: All call costs are flat rate, unless specified.

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- FSB 1600 MT/s

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http://www.winshop.com.au
http://www.computerdepot.com.au

finding yourself a provider. The good news is that there are plenty already with plenty more coming, much like the ISP proliferation when broadband finally, *ahem*, got going in Australia.

In a similar way in which you browse pricing plans for mobile phone providers, it's a good idea to shop about with your VoIP service provider. Usually there are no lock-in contracts, but the pricing for certain international, local and STD calls varies from provider to provider. If you're planning to make regular calls to a certain country then it's a good idea to check and see how much the per-minute call costs are to that destination. We've seen some countries charged at lower than two cents per minute.

A final cost is the handset charges (if you require one) and the charge for having a return phone number for your old-time phone user contacts to call you on.

There's a lot to take in, which is why we've compiled a table of pricing plans from a sampling of providers below. While it's in no means complete (new providers are appearing even as we go to print) it does give you a starting point for your own shopping. We have also included pricing from Telstra and Optus on normal landlines as a guide to savings too.

MORE THAN WORDS

The biggest hurdle VoIP vendors face in getting consumers to take it up is that it can be a confusing and complex technology, even though it's extremely simple to set up and use. We've focussed a lot so far on the simplicity of VoIP and how it works just like a POTS phone, so much so that a friend using your handset wouldn't notice the difference.

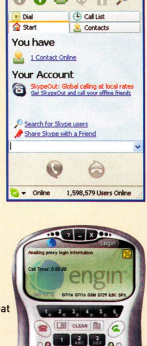
Right about now you might be asking yourself what, aside from the potential cash savings, is there to VoIP that would compel you to dump your current landline. So here are the clinchers – the things that a VoIP system can offer you that a standard telephone landline cannot.

Before we delve deeper, understand that this is about things that VoIP ▶

'...it's a good idea to shop about [when choosing] your VoIP service provider.'

SKYPE

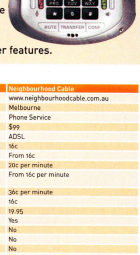
Type: Softphone
Web: www.skype.com



Free software-based service akin to MSN Messenger – only designed from the ground up to support voice chat. Double-clicking on a friend's profile calls them. The quality isn't as good as the dedicated VoIP services with some voice garbling and compression effects. Skype also offers off-network calls and the new Skypeln service offers DID numbers to become a viable software voice solution.

ENGIN XPRO

Type: Softphone
Supplier: engin
Web: www.engin.com.au
Price: $9.95 per month

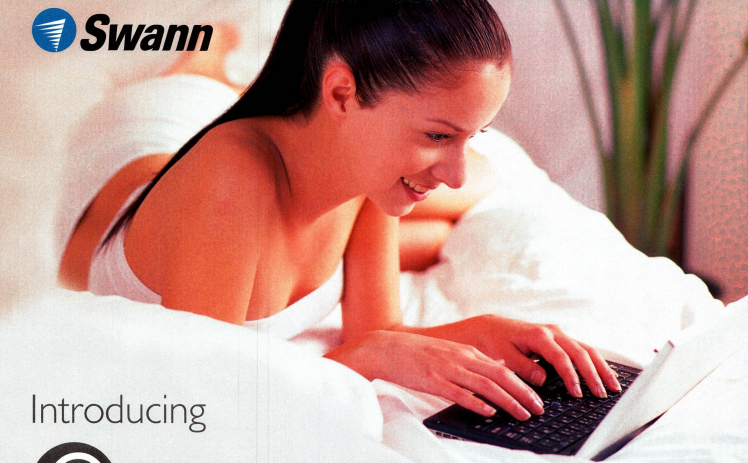


This softphone has a lot of great features, including a mic/speaker tune-up on installation and detailed call information. The interface is modern and stylish and calls are free between engin softphone users. You can also get a DiD number for use, plus many other features.

Company Name	FaktorTel	Ezzio	Freshtel	Neighbourhood Cable
URL	www.faktortel.com.au	www.engin.com.au	www.freshtel.com.au	www.neighbourhoodcable.com.au
Metro coverage	Nationwide	Global	Global	Melbourne
Plan A	FaktorTel Premium	engin Softphone	Firefly Softphone	Phone Service
Installation/hardware costs	None	Free download	Free	$99
Prerequisites	Dialup or better	Broadband	Firefly Softphone	ADSL
Local call costs	17.5c	10c	6.9c per minute	16c
Intercapital city	9.6c per minute (66c cap)	10c	6.9c per minute	From 16c
National call costs	12.9c per minute	10c per minute	6.9c per minute	20c per minute
International call costs	From 3.9c per minute	Varies	From 6.9c per minute	From 16c per minute
Call to mobiles	29.9c per minute	30c per minute	30c per minute	36c per minute
Flag fall	None	None	None	16c
Monthly fee	None	$9.95	None	19.95
Direct In Dial number	Optional - $12 per month	Not specified	No	Yes
Call waiting	Not specified	Yes	Not specified	No
Caller ID	Yes	Yes	Not specified	No
Voicemail	Yes	Yes	Yes	No
1300 & 000 number support	Yes	Yes	Not specified	Yes
Contract options	No contract	No contract	No contract	12 months
Plan B (if available)	Faktortel Standard	engin $19.95	N/A	N/A
Installation/hardware costs	None	$149	N/A	N/A
Prerequisites	Dialup or better	Broadband	N/A	N/A
Local call costs	6.6c per minute	10c	N/A	N/A
Intercapital city	6.6c per minute	10c	N/A	N/A
National call costs	6.6c per minute	10c per minute	N/A	N/A
International call costs	From 3.9c per minute	Varies	N/A	N/A
Call to mobiles	28.9 per minute	30c per minute	N/A	N/A
Flag fall	None	None	N/A	N/A
Monthly fee	None	$19.95	N/A	N/A
Direct In Dial number	Optional - $12 per month	Yes	N/A	N/A
Call waiting	Not specified	Yes	N/A	N/A
Caller ID	Yes	Yes	N/A	N/A
Voicemail	Yes	Yes	N/A	N/A
1300 & 000 number support	Yes	Yes	N/A	N/A
Contract options	No contract	No contract	N/A	N/A

NOTE: All call costs are flat rate, unless specified.

Swann



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- Supports: Windows & Mac

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- Super compact, lightweight design! Great for mobile users
- Supports both high-speed (480Mbps), full-speed (12Mbps), and low-speed (1.5Mbps) transfer rates
- This product relies on your computer's functioning USB 2.0 system to achieve USB 2.0 speeds
- Supports: Windows & Mac

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- Supports: Windows & Mac

RRP $89.95

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RRP $99.95

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	ED's PC's		www.edspcs.com.au
	Gamedude Computers	(07) 3387 1500	www.gamedude.com.au
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	QCG	(07) 3846 0888	www.qcgo.com.au
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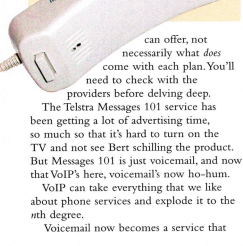
LET'S CHAT IP PHONE

Type: Handset
Supplier: 02VoIP (02) 9016 3844
Price: $41

A simple handset that plugs directly into your speaker and microphone 3.5mm ports, the Let's Chat phone features a volume control on the side, handset cradle with adhesive sticking pad (for affixing to a wall) and a speaker pass-through cable. It's a basic unit, and works with all softphones.



can offer, not necessarily what *does* come with each plan. You'll need to check with the providers before delving deep.

The Telstra Messages 101 service has been getting a lot of advertising time, so much so that it's hard to turn on the TV and not see Bert schilling the product. But Messages 101 is just voicemail, and now that VoIP's here, voicemail's now ho-hum.

VoIP can take everything that we like about phone services and explode it to the *n*th degree.

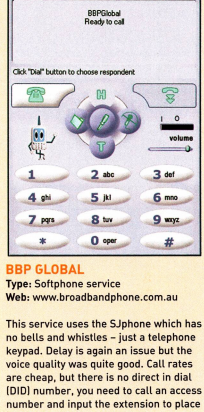
Voicemail now becomes a service that records your messages, and can either store them on the internet for you to access anywhere (via the web, POTS phone or VoIP phone) or can email these as low-bitrate WAV files to any email addresses you care to setup. Combine this with the 2GB of storage offered with web-based email services such as Google's free Gmail and you've got an access-anywhere voicemail (and one that lets you keep, delete and forward the voicemails as you see fit.)

Keeping with the email theme, you can also create white- and blacklists for phone numbers much as you can block or always allow emails in your email client. You can effectively divert calls to other numbers including mobiles and landlines, and you can 'out of office' the line so it always goes to voicemail. With the web-based nature of VoIP configurations it's easy to keep track of, configure and update these settings regardless of where you are.

Another function with ATA integrated handsets is that you can travel globally with the device, plug it into a network and still receive and make phone calls with your standard Aussie phone number.

With softphone services all you need is your user login and a headset to do the same. Many internet cafes globally already have the headsets anyway for LAN gaming.

Anyone who has ever tried to port a home phone number from one address



BBP GLOBAL

Type: Softphone service
Web: www.broadbandphone.com.au

This service uses the SJphone which has no bells and whistles – just a telephone keypad. Delay is again an issue but the voice quality was quite good. Call rates are cheap, but there is no direct in dial (DID) number, you need to call an access number and input the extension to place an ingoing call.

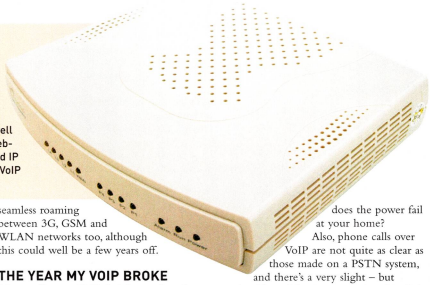
Company Name	Simtex	YouSe	People Telecom	TalkScape
URL	www.simtex.com.au	nella.net.au	www.peopletelecom.com.au	www.talkscape.com.au
Metro coverage	Nationwide	Melbourne	Nationwide	Nationwide
Plan A	Casual Users	Smartvoice Line Basic	people iPhone	Lite
Installation/hardware costs	None	From $22	Part of ADSL connection costs	$25/+$30 for DID number
Prerequisites	Broadband	ADSL	People Telecom broadband	Broadband
Local call costs	16c	20c	15c	16.8c
Intercapital city	13c per minute	20c per 30 minutes, then 4c per minute	12c per minute	9.9c per minute
National call costs	13c per minute	20c per 30 minutes, then 4c per minute	12c per minute	9.9c per minute
International call costs	From 5c per minute	From 4c per minute	From 9c per minute	From 4.9c per minute
Call to mobiles	37c per minute	30c per minute	30c per minute	29.9c per minute
Flag fall	None	None	None	None
Monthly fee	None	$9.95	$5.50	$9.95
Direct In Dial number	Optional - $1.95 per month	Yes	Not specified	Optional – $7 per month
Call waiting	No	Yes, depending on the equipment option	No	Not specified
Caller ID	Yes	Yes	No	Not specified
Voicemail	Yes	Yes, depending on the equipment option	No	Not specified
1300 & 000 number support	Yes (000 unavailable)	Yes	No	No
Contract options	No contract	No contract	12 months	No contract
Plan B (if available)	Loyalty Plan 15	SmartVoice Line Advanced	N/A	Home
Installation/hardware costs	None	From $22	N/A	$25/+$30 for DID number
Prerequisites	Broadband	Broadband	N/A	Broadband
Local call costs	13.6c (200 free)	10c	N/A	16.8c
Intercapital city	11.05c per minute	10c for 30 minutes, then 4c per minute	N/A	9.9c per minute
National call costs	11.05c per minute	10c for 30 minutes, then 4c per minute	N/A	9.9c per minute
International call costs	From 4.5c per minute	From 4c per minute	N/A	From 4.9c per minute
Call to mobiles	31.45c per minute	25c per minute	N/A	29.9c per minute
Flag fall	None	None	N/A	None
Monthly fee	$25.95	$24.95	N/A	$29.95
Direct In Dial number	Yes	Yes	N/A	Optional – $7 per month
Call waiting	No	Yes, depending on the equipment option	N/A	Not specified
Caller ID	Yes	Yes	N/A	Not specified
Voicemail	Yes	Yes, depending on the equipment option	N/A	Not specified
1300 & 000 number support	Yes (000 unavailable)	Yes	N/A	Not specified
Contract options	No contract	No contract	N/A	No contract

NOTE: All call costs are flat rate, unless specified.

OCTTEL VOIP GATEWAY

Type: ATA/Router
Supplier: Octtel
Web: www.octtel.com.au
Price: $299

This device is suited to very large households and small businesses. It supports 4 lines as well as being a four-port Ethernet switch. It has web-based configuration and supports most SIP and IP standards and is a great way to get multi-line VoIP happening at your place.



to another will immediately recognise the freedom and simplicity that both of these methods afford you. And we're only just scratching the surface of what can be done.

A VoIP call is data, and so it needs to be thought of as data, not an analog medium as phone calls have been until now. Already there's a lot of user power with VoIP, and there's much more functionality and features coming.

These include the potential for VoIP over wireless LANs, plus provider-to-provider wireless LAN roaming. There's also talk of seamless roaming between 3G, GSM and WLAN networks too, although this could well be a few years off.

THE YEAR MY VOIP BROKE

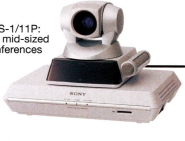
It's not all a rosy VoIP-led future though.

Firstly, detractors of VoIP are quick to point out that if the power to your house or office fails, then the VoIP fails. It's not like your PSTN service that keeps working even when the lights are out, so it's a definite weak-spot. But then, how often does the power fail at your home?

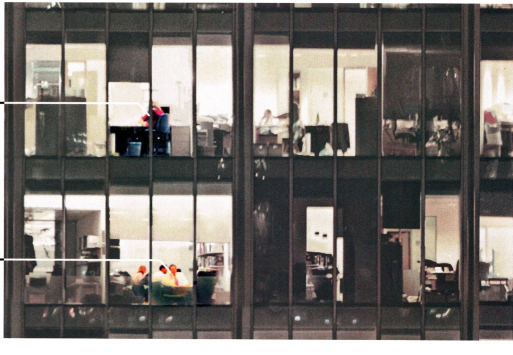
Also, phone calls over VoIP are not quite as clear as those made on a PSTN system, and there's a very slight – but noticeable – delay. In our testing this slight lag persisted, and while it was slight some people may find this intolerable. We also noted that the more you're doing with your connection (downloading, surfing and streaming) the longer this voice lag drags out. It was a curious experiment – add

Sony's new videoconferencing systems

PCS-TL50P:
For the Executive



PCS-1/11P:
For mid-sized conferences



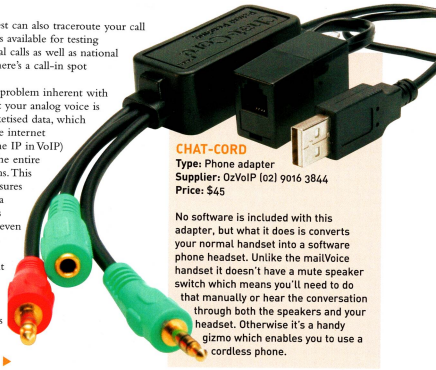
more files to the download client and the voice delay extends a little.

The actual bandwidth requirements for a VoIP call rests around 64Kb/s which is why dial-up connections just won't cut the mustard. This bit rate depends on the codec used to encode the voice, but 64Kb/s is about optimal. Some services offer a variable bit rate codec that modulates the call quality depending on the available bandwidth, and this can go up or down. As for actual increases to your download caps, you can work on around 1MB of data for a ten minute call, or 6MB per hour, which really isn't much unless you have low data download caps and you or someone in your family likes to chat.

It's important to keep this rough figure of 64Kb/s in mind though if you're considering a VoIP roll-out of multiple lines in your home or office, as the multiple simultaneous calls will gobble up your bandwidth. Plan ahead. If you already have VoIP or are about to get it, you can test the bandwidth your VoIP calls take at Test Your VoIP (www.testyourvoip.com).

This free test can also traceroute your call paths, and is available for testing international calls as well as national now that there's a call-in spot in Sydney.

Another problem inherent with VoIP is that your analog voice is sent as packetised data, which relies on the internet protocol (the IP in VoIP) on which the entire internet runs. This protocol ensures that the data arrives at its destination even though it is split and different packets may make short hops while others take languorous routes, but ▶



CHAT-CORD
Type: Phone adapter
Supplier: OzVoIP (02) 9016 3844
Price: $45

No software is included with this adapter, but what it does is converts your normal handset into a software phone headset. Unlike the mailVoice handset it doesn't have a mute speaker switch which means you'll need to do that manually or hear the conversation through both the speakers and your headset. Otherwise it's a handy gizmo which enables you to use a cordless phone.

ave got a lot of people talking.

SONY

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IPELA

eventually an entire message arrives and is compiled in a higgledy-piggledy fashion at the destination.

This is fine for data transfers and is why streaming audio and video is buffered – the buffering accounts for the way the data travels and takes care of potential lags and skips. Yet it is still not perfect.

Quite obviously buffering, lags and dropouts are unforgivable sins for instantaneous communication such as voice, and this is a point also raised by VoIP-naysayers. It's a valid argument however, as there's nothing in the internet protocol that offers the quality of service (QoS) that VoIP requires.

Limiting VoIP to broadband services goes a long way to ensuring that the end-to-end internet connections have a high enough bandwidth (higher than the VoIP call uses) so that packets arrive quick enough.

Another way of ensuring better voice quality is by building a better protocol wrapper for the packetised data. One of the newer VoIP protocols rapidly gaining favour among companies is SIP, or session initiation protocol.

SIP is a protocol which was developed by the Internet ▶

NETGEAR BROADBAND VOICE ADAPTER TA612V

PREVIEW
Type: ATA/Router
Price: TBA
Supplier: TBA

Seemingly a Mac mini-inspired piece of machinery, the TA612V supports up to two lines and acts as a two-port hub.
To use on its own requires knowledge of network protocols, but once configured works seamlessly. The front display is also quite helpful with illustrated lights giving at-a-glance information on connection status.

NETCOMM V40 USB VOIP HANDSET

PREVIEW
Type: Handset
Price: TBA
Supplier: Netcomm
Web: www.netcomm.com.au

Resembles a mobile handset but otherwise encumbered by the necessary USB cable. Dialing directly into the phone brings up the SIPiPhone software and pressing 'send' dials the number for you. Will suit most other SIP applications as well. A good looking and well built device.

Company Name	SIPME	MyFone	PennyTel	Skype
URL	www.sipme.com.au	www.myfone.com.au	www.pennytel.com	www.skype.com
Metro coverage	Global	Nationwide	Global	Global
Plan A	SIPME Unlimited	SuperSaver	Free Access Plan	Skype
Installation/hardware costs	None	None/$45+ for handset	None	None
Prerequisites	Dialup or better	Broadband	Broadband	Dialup or better
Local call costs	Included in monthly access fee	10c	2c per minute	3c per minute
Intercapital city	Included in monthly access fee	10c per minute	2c per minute	3c per minute
National call costs	Included in monthly access fee	10c per minute	2c per minute	3c per minute
International call costs	Unlimited to seven countries/From 3c per minute for others	From 2c per minute	From 1.1c per minute	From 3c per minute
Call to mobiles	30c per minute	29c per minute	22c per minute	29c per minute
Flag fall	None	None	None	None
Monthly fee	$69.95	None	None	None
Direct In Dial number	Optional - $5 per month	No	Optional - $6 per month	Optional - $16.75 for 3 months
Call waiting	No	Yes	Not specified	Not specified
Caller ID	No	No	Not specified	Yes
Voicemail	No	Yes	Not specified	Yes
1300 & 000 number support	Yes (000 unavailable)	Yes	Yes	Not specified
Contract options	No contract	No contract	No contract	No contract
Plan B (if available)	No Plan	MegaSaver	Silver Unlimited	N/A
Installation/hardware costs	None	None/$45+ for handset	None	N/A
Prerequisites	Dialup or better	Broadband	Broadband	N/A
Local call costs	3.5c per minute	10c	2c per minute*	N/A
Intercapital city	3.5c per minute	10c per minute	2c per minute*	N/A
National call costs	3.5c per minute	10c per minute	2c per minute*	N/A
International call costs	From 3c per minute	From 2c per minute	From 1.1c per minute*	N/A
Call to mobiles	30c per minute	29c per minute	22c per minute*	N/A
Flag fall	None	None	None	N/A
Monthly fee	None	$15	$20	N/A
Direct In Dial number	Optional - $5 per month	Yes	Optional - $6 per month	N/A
Call waiting	No	Yes	Not specified	N/A
Caller ID	No	Yes	Not specified	N/A
Voicemail	No	Yes	Not specified	N/A
1300 & 000 number support	Yes (000 unavailable)	Yes	Yes	N/A
Contract options	No contract	No contract	No contract	N/A

NOTE: All call costs are flat rate, unless specified.

- Plan includes 360 minutes to 30 countries free

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Extenion Model Name			
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	Model Name	GA-8S661FXMT M/B	GA-K8VM800M M/B (K8 754)
	12in1 card reader	Yes	Yes
PSU	Power	300W V2.0 /PFC	300W V2.0 / PFC
	FAN	12cm	12 cm
Chassis	Logo Printing	Gigabyte	Gigabyte
	Color	Black	Black
	SYS FAM	12 cm	12 cm
	F-USB	2	2
Prepherial	Cable	FDD,HDD,ODD,SATA cable, Power cord	FDD,HDD,ODD,SATA cable, Power cord
	Keyboard	4P-Black PS2	4P-Black PS2
	Mouse	3U USB interface	3U USB interface
	Speaker	GS-1P	GS-1P

USB 2.0 Disk Memory

GO-U128MB
GO-U256MB
GO-U512MB
GO-U1G

Optical Drive
Additional Beige Panel

16 X DVD-ROM
DVD-COMBO
16X DVD-DUAL BURNER

LCD Monitor Series

Editor's Choice February 2005 apc

Model	GD-1903DP	GD-1703BP/DP
Display Type	19" TFT LCD	17" TFT LCD
Display Area	376(H)x301(V)mm	338(H)x270(V)mm
Max. Resolution	1280(H)x1024(V) @75Hz	1280(H)x1024(V) @75Hz
Pixel Pitch	0.294x0.294mm	0.264x0.264mm
Contrast Ratio	700:1 (Typical)	450:1 (Typical)
Brightness	250 cd/m² (Typical)	260 cd/m² (Typical)
Response Time	25ms	16ms
Viewing Angle	170°(H),170°(V)	140°(H),140°(V)
Audio Output	2.5 Watt x 2	2 Watt x 2
PC Connector	D-sub 15pin, DVI	BP:D-sub 15pin DP:D-sub 15pin, DVI

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PC Games Addict - April 2005

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For a list of resellers visit www.au.creative.com/retailers or call 02 9021 9800

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Engineering Task Force (IETF) which was originally put together to work on the internet protocols, and was a driving force behind the standardisation of the web.

Most other popular VoIP protocols have been developed by the International Telecommunication Union (ITU). Some say SIP is zipping up the charts as it was created by a group that understands the internet, and is shaping data toward phone usage, and not by a telecommunication group that is trying to squeeze phones onto a data usage model.

The answer probably lays between the two, but the majority of the products we have tested in the roundup, and certainly those we have seen for home use, have been based on the SIP protocol.

An advantage for us consumers getting into VoIP is that the SIP standard means that SIP-based services are compatible with SIP-based hardware. So the ATA you get bundled with one package can be re-used with another provider, much in the same way a mobile phone works across carriers.

TESTING TIMES

Just as there are many different ways and means to get VoIP working at home or at the office, similarly we received a whole cross-section of hardware and software to evaluate. These included ATA routers, ATAs, softphones, IP phones, headsets and more.

We tested all thoroughly, with VoIP-to-VoIP calls, international calls, STD calls and mobile calls, and all the while we kept coming back to the basic truths: making a VoIP call is as painless as a landline call, but at times the quality isn't *quite* on par. It's about the equivalent of an average-to-good landline call.

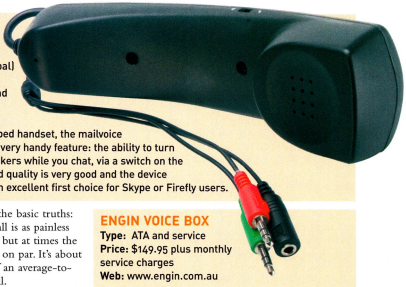
However, and this is a huge however, regardless of the voice quality and the potential of losing your phone should the power fail, the sheer freedom and latitude that VoIP affords users, not to mention the huge cost savings, helps the medicine go down.

We've no hesitation in recommending VoIP whatsoever – the call savings alone justify the initial outlay.

Get talking. ▶

MAILVOICE

Type: Handset
Price: $40 (with BBP Global)
Web: www.broadbandphone.com.au



A familiar-shaped handset, the mailvoice incorporates a very handy feature: the ability to turn off the PC speakers while you chat, via a switch on the side. The sound quality is very good and the device comfortable, an excellent first choice for Skype or Firefly users.

ENGIN VOICE BOX

Type: ATA and service
Price: $149.95 plus monthly service charges
Web: www.engin.com.au

This is another ATA service, which requires the use of an external router. You can register via the website or call customer service. The ATA is fairly solid and also supports two lines. Call quality isn't as good as the MyFone service, but it is an easy to setup service, and as such is designed as a friendly introduction to the world of VoIP.

NORMAL PHONE CHARGES

Along the bottom of the previous pages we've had a running table sampling some of the many VoIP plans and charges available from IP phones to ATAs to just plain services.

Here's the litmus test though, as opposite we have a conglomeration of the cheapest home landline charges as gleaned from both the Optus and Telstra websites.

It's easy to see at a glance where savings may come from, but as always finding the best bargain is a case of doing your homework. Analysing your current phone usage also helps, particularly if you have intemised billing before you begin shopping around for the best bargains.

Company Name	Optus	Telstra
URL	www.optus.com.au	www.telstra.com
Metro coverage	Eastern states/Nationwide	Nationwide
Plan A	OneTouch Advance/Call Saver	HomeLine Budget
Installation/hardware costs	None	None
Prerequisites	Optus-cabled property	None
Local call costs	20c	30c
Intercapital city	From 16c per minute	From 15c per minute
National call costs	From 16c per minute	From 15c per minute
International call costs	From 9c per minute	From 21c per minute
Call to mobiles	37c per minute	From 37c per minute
Flag fall	None	35c
Monthly fee	$25.95	$18.50
Direct In Dial number	Yes	Yes
Call waiting	Yes	Yes
Caller ID	Yes	Yes
Voicemail	Yes	Yes
1300 & 000 number support	Yes	Yes
Contract options	12 months	None
Plan B (if available)	N/A	N/A
Installation/hardware costs	N/A	N/A
Prerequisites	N/A	N/A
Local call costs	N/A	N/A
Intercapital city	N/A	N/A
National call costs	N/A	N/A
International call costs	N/A	N/A
Call to mobiles	N/A	N/A
Flag fall	N/A	N/A
Monthly fee	N/A	N/A
Direct In Dial number	N/A	N/A
Call waiting	N/A	N/A
Caller ID	N/A	N/A
Voicemail	N/A	N/A
1300 & 000 number support	N/A	N/A
Contract options	N/A	N/A

Spit and spam

Spam emails are the scourge of online correspondence. They clog the channels, fill your inbox, enrage the calm and offend the sensitive. Imagine spam making the transition to VoIP...

Spam. We won't go into much detail about the stuff but suffice to say that as annoying as it is, spam is not going to go away any time. Unfortunately there are enough idiots out there clicking and buying from spam to make it a worthwhile and hugely successful money-making exercise. Spam's here to stay.

Voice over IP is still a relatively new technology, but fears have been raised already about voice spam – or spit (spam over internet telephony).

If the occasional calls from telemarketers make you mad, just wait until your phone rings off the hook with recorded messages for cheap Rolexes, penis enlargement pills, diplomas, porn sites and crazily low mortgage rates. It's a nightmarish scenario that could only be made worse by the intrusive nature of a ringing phone.

Where a PSTN phone system is reasonably hard to hack into (eavesdropping aside), a VoIP phone call is essentially packetised data sent over the internet.

While snooping on phone calls is not such a problem, the vulnerabilities with data traffic are obvious, especially when you think of VoIP as nothing more than data traffic. This is not to mention the threat if a potential 'spitter' manages to crack a VoIP provider's customer phone list. Look out.

As VoIP broadens its reach and the uptake increases, so too will the discovery and potential exploitation of security holes, loopholes in the technology flourish. With this will come increased attacks, patching, dropouts and the inevitable industry churn from consumers.

Probably the first vulnerablity to be exploited will come in the form of randomised, automated spit calls. And these may not even initially exploit holes in the technology.

Now, where we can tolerate an enormous quantity of spam in our inboxes before we get mad, it would only take one, or possibly two, spam phone calls before we ditch the service. Particularly if these calls arrive in the middle of the night when the originator's country is awake.

Unsolicited, random phones calls to thousands of PSTN lines would be prohibitively expensive, but automated exploitation of VoIP may be a cost-effective solution for spitters.

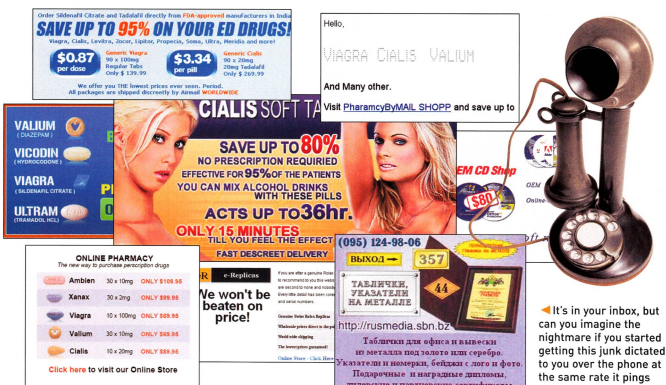
The good news is that the VoIP service providers are working on the potential problem, and even you the user can potentially create white and blacklists for callers (much as you do with emails). There are also tough screening processes being put in place that block and deny automated calls from spit sources at the ISP end.

While spit is yet to eventuate, it's a very real potential problem and it's hard not to let the paranoia get the better of you.

An even more worrying and frightening possibility is that these checks and balances will be great at eliminating spit calls from automated servers and pre-recorded messages, but what about the human element?

No, we're not talking about a spitter sifting through the phone book and manually calling people one-by-one, but when you factor in the cheapness, the proliferation of out-sourced call-centres, the fact that we've already had VoIP telemarketing calls from Sanjeev and his mates for Aussie companies, and it's not such a stretch to imagine human-dialed spit phone calls coming in from India or Russia.

"*Hi, it's Boris here. You don't know me, but a friend of yours said that you were in need of some cheap Viagra...*" ▶



◀ It's in your inbox, but can you imagine the nightmare if you started getting this junk dictated to you over the phone at the same rate it pings your email?

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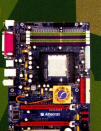

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Video conferencing

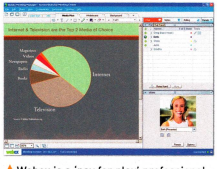
If merely speaking to someone over the internet isn't enough for you, then there's always video conferencing. Here's VoIP's big brother.

The year 2000 has been and gone and we still aren't making video calls from the moon yet. And even though video conferencing, like VoIP, has been with us for some time, the lack of broadband takeup has prevented the technology from taking hold. But, with 2005 tipped to become 'the year that VoIP broke', video conferencing can't be far behind.

Curiously, despite webcams being available for over ten years, there are relatively few dedicated video conferencing tools, especially when compared to the myriad services available for VoIP. The big four IM programs (MSN Messenger, Yahoo Messenger, ICQ and AOL Instant Messenger – all offer video abilities as well as voice calls, but these functions are bolted on rather than built from the ground up.

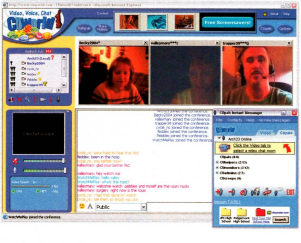
SOFTWARE

First you'll need software, and there are a number of freeware programs available, usually cut-down versions of commercial applications. Here are the major ones:



▲ Webex is a 'pay for play' professional video conferencing tool.

▼ CUpals enables voice chat with up to three people for the free version, and the interface is clutter-free.



CUWORLD

CUseeMe was the original web conferencing program, and probably the most well-known. It was discontinued in 2003 after CUseeMe Networks was bought out by another company, however, continuing in its place is CUworld, and after registering on its site (www.cuworld.com) you are able to download the CUpals package.

CUpals is split into two panels: the first is a list of chat rooms and the second allows you to add and call your own contacts. The chat rooms are rated according to content – handy for parents. CUworld operates in a browser, and like CUseeMe, can handle up to 21 cameras per window. Most users still type, but the option for voice is there.

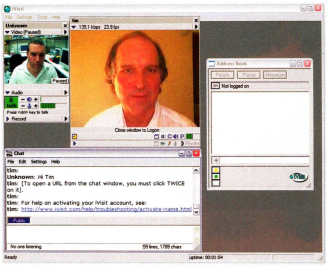
It's a fairly simple program to use as it's closely modelled on a familiar IM interface, the only drawback being you cannot adjust voice and video settings without actually joining a chat first.

EYEBEAM

Eyebeam is the video conferencing version of the X-Lite softphone. It's virtually identical to X-Pro, but the voice chat is enabled in a sidebar. Similar to IM apps, the video conferencing does seem to be bolted on and won't do much to popularise video conferencing by itself.

IVISIT

An interface broken up into separate windows helps set this apart from its browser based origins. iVisit is designed by the people who brought you the original CUseeMee, but instead of being browser based it uses a series of windows and an



▲ iVisit is unlike other tools in that it doesn't use an IM-type interface.

▲ Superceding X-Pro is Xtel's eyeBeam which adds video conferencing.

IM-type friends list. It also includes a chat window and voice capabilities. The free version limits you to a 60 min conversation and a smaller video window, but upgrading increases your options. More 'business' than pleasure, but still an acceptable free tool for video chat.

WEBEX

Webex is designed for use as a business tool. It's available on its own or as a plugin for AIM and Windows Messenger. But its certainly not free – you can download it, but it uses a timed payment system where you pay for how much you play.

MSN MESSENGER 7

As mentioned, Messenger has had video capabilities for some time, but the newest version both simplifies and then expands on these.

For example, if only one person has a webcam you now have the option to 'send'

webcam images. The webcam then appears in the portrait section of the chat window – a fairly nifty feature. It's also scalable, and will refresh according to the receiver's connection. Full-screen video is now also supported in this latest version.

HARDWARE

So there are a couple of programs you can use to talk face-to-face with your friends, but what hardware do you use? The following three examples are only a very small portion of the video conferencing devices that are available:

SWANN MAX-I-VISION USB 2.0 WEBCAM WITH AUDIO

Price: $99
Supplier: Swann
Web: www.swann.com.au

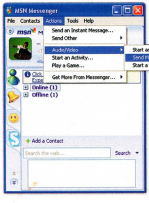
Dropping the very popular 'cycloptic golfball' appearance of most webcams is the stylish and professional-looking Swann Max-I-Vision webcam. It comes with a large and rugged clip for connecting to flatscreens or laptops, and with an adhesive back for fixing to a CRT.

In VGA mode it supports up to 25fps, thanks in part to it's USB 2.0 specification. The cam is also detachable from the base – though it's 1.5m cord won't let you roam very far. There's a button on top to facilitate motion- or still-captures and a focus wheel as well. If you're in the market for a cheap, quality webcam, this would be the one to buy.

LOGITECH QUICKCAM PRO 4000

Price: $199
Supplier: Logitech
Web: www.logitech.com.au

Logitech has been at the forefront of webcam sales for the past decade, and so you'd expect it's next-to-flagship model to be something special. It certainly boasts some impressive features, with the most outstanding being the Face Tracking system.



▲ MSN Messenger 7 adds further video conferencing tools to its chat interface.

This follows your face to move around within the cam's field of vision – it's a little jerky but it works – and of course you can turn the feature off if you want.

The cam is the common ovoid shape, and apart from its stand also includes a bracket to mount onto LCD's. The only dissapointment with the QuickCam Pro is that its image quality isn't up to scratch compared to the Swann – which is half its price. But if face tracking is something you're looking for it could be worth considering.

CONCLUSION

There are several applications to choose from if video conferencing is the way you want to go. But high tech video phones are still a long way off. Yet, if you want to 'try the futire today', then try one of the applications on this page and get yourself a cam such as the excellent Swann Max-I-Vision.

▲ The Max-I-Vision is a flexible and professional desktop camera. In comparison is Logitech's classically styled QuickCam Pro 4000.

SONY PCS-TL50 VIDEO COMMUNICATION SYSTEM

Price: $8800
Supplier: Sony
Web: www.sony.com.au

For those with money to burn is Sony's PCS-TL50, an all-in-one video conferencing system. It's designed to be hooked up to other PCS-TL50's – which involves lots of IP address entries and navigating the system's various menus. But it can be connected to a PC via a router or an optional 'Data Solution Box' (with an extra $2200 plus tax), and use Sony's proprietary software phone (also not included).

The system has a built in camera and microphone, a fairly sophisticated remote control, and will also double as an expensive LCD monitor.

One major disappointment is that the only practical way to use one of these is to know someone else with one. One for Kerry Packer's board room, perhaps. But the rest of us can only dream.

▲ Stylish but prohibitively expensive for the home user: Sony's PCS-TL50.

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D. ● VPN endpoints

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C. ● 18 months
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MAXIMUM SECURITY PC

Out on the internet, no-one can hear you scream. **Tim Dean** looks at how to lock down your PC to keep it safe from all threats. ▸

It's a sad truth that we can no longer innocently connect a PC to the internet without it becoming the target of miscreant hackers, script kiddies and viruses. These days we are faced with a multitude of dangers that attack every possible entry point of our PCs. This means just having one or two aspects covered, such as having anti-virus without a firewall, is no longer adequate in keeping your PC safe. Furthermore, as 'malware', or any software written with malicious intent, is becoming more commercially motivated, there's more reason than ever before to make sure you're PC and/or network is protected.

The lion's share of attention is still focused on viruses, although technically most of the viruses that are floating around today are better classified as worms. A virus will typically infect a host file, which is usually another executable file such as another program. When the infected file is run, the virus attempts to infect other files, or spread to another system.

which propagated itself by looking for PCs on the internet with port 135 open, and it then used a vulnerability in Microsoft's DCOM RPC to copy itself across. This meant a user become infected without any interaction at all.

The third category of virus that is causing havoc these days is the trojan horse. As the name suggests, a trojan poses as another program, but contains malicious code that runs in the background. Trojans can include things like key loggers that sniff for passwords or other personal information or diallers that secretly dial a far away country, potentially costing you thousands. Alternatively the trojan could open a back door that can be used later by a hacker to gain access to your PC, or it could launch a denial of service (DoS) attack using thousands of infected machines on the net.

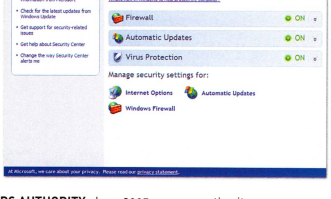
Another type of malware that installs itself without your knowledge is the new annoyance of spyware. The moniker 'spyware' is applied to a range of software that gathers

'...an infection today could mean your bank account is emptied overnight, or your identity is stolen leaving you with a bad credit record for years.'

A worm, on the other hand, is even more insidious. It doesn't necessarily infect another executable, and it doesn't need a user to run the file in order for it to spread. A worm takes advantage of vulnerabilities in networking and application code to automatically replicate over a network. A good example of a worm is Blaster, also known as MSBlast and Lovsan,

information from your PC and sends it to another computer on the net. One example is adware, which monitors your internet browsing habits, then reports back to a central server to tailor advertising to you. These ads then appear as pop ups while you're browsing, or even while you're offline. Not only are these pop ups irritating, and often inappropriate, the software violates your privacy by tracking your online movements, and it also clogs up your system and internet connection, and can alter your system or browser settings without your consent.

▼ Windows XP Service Pack 2's built in Security Center is useful in reminding you about Windows updates or out of date anti-virus definitions.



Beyond viruses, trojans and spyware, people themselves can also be a threat to your system. Hackers, or crackers depending on your definition, can use a variety of easily available tools to browse the internet for unprotected PCs. They can then infiltrate these systems, and depending on their intentions, either steal personal information, or commandeer the PC for their own nefarious ends, such as installing a back door, or other software to turn your PC into a 'zombie'. In fact, anti virus company, MessageLabs, believes that over 70 percent of spam is now being sent from these zombie systems that have been hacked or infected with a trojan, and up to 70,000 new zombies are appearing on the internet each week.

Another layer of security is also needed if you're running a wireless network. Not only are you still vulnerable to the threats listed above, but you're also broadcasting all your network traffic to anyone who cares to listen up to 100 metres away. Even with encryption and a variety of other security tools, it's amazing how many wireless networks are still left entirely unprotected. If your wireless network has vulnerabilities, not only could someone potentially listen in on all your network communications, but they could gain access to your PC and be able to browse your private files.

The final threat to your PC is not so remote, and comes from users themselves. You can have all the anti-virus and firewall protection in the world, but that could still leave your PC vulnerable to someone breaking into your home, powering it up, and gaining unrestricted access to its contents.

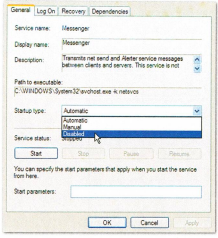
The cost of infection with a virus, or the implications of being hacked, are also higher today than they were several years ago. While a virus infection that uses up system resources or corrupts essential files can be very costly in itself, many modern threats are of a commercial nature.

Security company, McAfee, estimates that around 70 percent of all malware is written for profit. This means an infection today could mean your bank account is emptied overnight, or your identity is stolen leaving you with a bad credit record for years. For this reason it's imperative that you have all possible entry points covered, and you remain vigilant to new threats as they appear.

STEP 1 WINDOWS BASICS

Before installing any other security software on your PC, the first thing you need to do is ensure your system and Windows itself are properly set up. Thankfully, Windows XP is significantly more secure out of the box than any of its predecessors, especially the Windows 9x series. If you're still running Windows 98 or Windows ME, the $150 upgrade cost to move to Windows XP Home is highly recommended.

If you're installing a fresh copy of Windows XP on your system, then be sure to choose NTFS as the file systems. NTFS is substantially more advanced than FAT, and includes a range of security features that operate on the files themselves, such as permissions and encryption. The next step



▲ **The Messenger service is different from Windows Messenger. Disable it to prevent desktop spam.**

is to install Service Pack 2 and any critical updates from Windows Update.

After all the essential updates are installed, you'll notice that Windows will grace your system tray with its Security Center icon. This applet will monitor your firewall, Windows updates and anti-virus settings to make sure they are running properly. This applet doesn't cover everything, but it's a useful way of being reminded to install Windows updates or to download the latest definition file for your anti-virus program.

STEP 2 MESSENGER

The next step when getting Windows secure is to disable the Messenger service. This is different to the instant messenger application, Windows Messenger. The Messenger service is mainly used on corporate networks to distribute instantaneous messages to the screens of workstations on the network. These pop up on screen and look like a system message with an OK button. However, the Messenger service is also accessible over the internet and can be used to deliver spam straight to your desktop.

To disable the Messenger service, go to Start, Run and type services.msc to bring up the Services Management Console. Scroll down to Messenger, and double click it. If the service is currently running, then hit the Stop button. Then, change the Startup type to Disabled.

The ultimate in security for Windows XP is the Local Security Settings Management Console. This allows you to control minute details such as which users can access the PC over a network, or change system settings, as well as setting password policies and much more. You can access the Local Security Settings by going to Start, Run and typing secpol.msc.

STEP 3 USER ACCOUNTS

An often overlooked aspect of PC security is user accounts and passwords on the PC itself. Most Windows XP users simply have a single user account with full Administrator privileges that they use on a daily basis. This is not the most secure way of doing things, as if you do happen to get hit by a trojan or a hacker while you're logged in, they will have full Administrator privileges as well. A better way is to create a user account for yourself with only the privileges you need, such as the ability to create and change files, but not the ability to install software or change the registry. If you do need to access something with full Administrator privileges, then simply right click the file and select Run as, and choose Administrator.

It also pays to have a password on your user account, which will protect your files in the event your PC is stolen or compromised in another way. Creating a strong password is also a bit of an art, and should include a combination of lower case and upper case letters, numbers and punctuation.

If you want to add an even further layer of security to your PC, you can also consider adding a password in your BIOS. This means every time your PC is powered up, you'll have to enter the password in order to boot into Windows. This will prevent anyone from even being able to access the files on your system through boot disks, or other means.

PASSWORDS

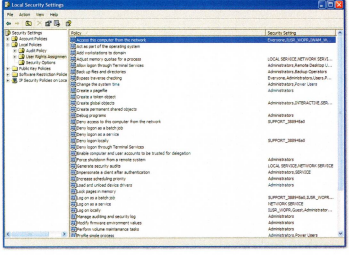
There's a bit of an art to creating a strong password. Obvious things to avoid are sequential letters, numbers or common words, but you also don't want to go all the way to the other end of the spectrum and create a password that is so complex and counter intuitive that you can't remember it.

A strong password should always contain a mixture of upper case and lower case letters, numbers and punctuation. One good method to create a strong but memorable password is to start with a phrase, such as 'a bird in the hand is worth two in the bush'. Then take the first letter of each word, and substitute them with upper case letters, numbers or symbols that resemble the letter, thus turning it into 'dBtitHtw2itB'.

Be warned though, a BIOS password is neither fool proof nor 100 percent reliable. The main problem with BIOS passwords is if you forget it, you could potentially lock yourself out of your entire system.

Given that, it's also not very difficult to bypass a BIOS password, as a simple CMOS reset will clear the password. This is only preventable if you also have a lock on your PC case to prevent anyone getting inside to ▶

▼ **Control who can access your PC through the Local Security Settings dialog.**



VIRUSES THROUGHOUT HISTORY

1982 Elk Cloner infects Apple II floppy disks.

1983 Term 'virus' coined by Fred Cohen in a research paper.

1986 First PC virus, Brain. Infected boot sector of floppy disks.

1987 Jerusalem is the first virus to infect .exe and .com files.

1987 The first MBR virus written, called Stoned.

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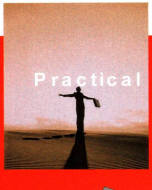

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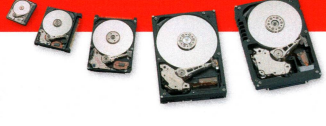

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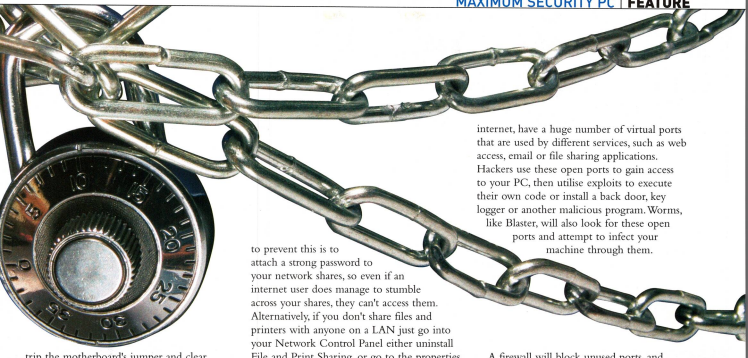


trip the motherboard's jumper and clear the CMOS.

If you're running Windows 9x or ME, then there is also a potential security risk when you have File and Print Sharing enabled. If you have File and Print Sharing bound to TCP/IP, and you actively share a directory but don't password protect it, then it's potentially accessible from the internet. The easiest way to prevent this is to attach a strong password to your network shares, so even if an internet user does manage to stumble across your shares, they can't access them. Alternatively, if you don't share files and printers with anyone on a LAN just go into your Network Control Panel either uninstall File and Print Sharing, or go to the properties of TCP/IP and unbind it.

COMMON PORTS

The following are some TCP/IP ports that are used on the internet. There are many thousands of other ports that are used by specific applications, so you may need to do some research on which ones you need to open in your firewall for the apps to work.

- **21** FTP: used for sending and receiving files
- **23** telnet: used to connect and interact with a remote computer
- **25** SMTP: outgoing internet email
- **70** gopher: an old protocol for searching documents online
- **79** finger: old system for finding information on people or computers online
- **80** HTTP: used by your browser to access the web
- **110** POP3: incoming internet email
- **443** HTTPS: used to make secure web connections

STEP 4 HACKERS

In terms of security risks, being hacked by someone on the internet is fairly unlikely. Typically a hacker will only target a system they already know to have information they want to retrieve. There's not much point hacking a home PC as it's very unlikely the hacker will find anything worth the effort. However, occasionally they can get lucky and find personal information such as banking details, passwords or credit card numbers, or they could install a backdoor or keylogger for future use.

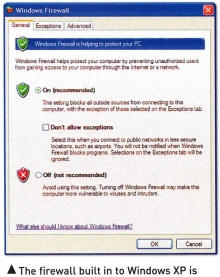
There are also a wide range of hacking tools that are easily accessible to many people on the internet, and these can automate much of the process of gaining access to huge numbers of home PCs in search of valuable information. People who take advantage of these hacking tools are usually called 'script kiddies' as a derogatory term as they don't actually have hacking skills themselves. Still, a script kiddie can cause you considerable damage, so it's worth protecting yourself against them.

STEP 5 FIREWALLS

The best way to secure your PC from being invaded is to use a firewall, which prevents unauthorised traffic from gaining access to your PC. TCP/IP networks, such as the internet, have a huge number of virtual ports that are used by different services, such as web access, email or file sharing applications. Hackers use these open ports to gain access to your PC, then utilise exploits to execute their own code or install a back door, key logger or another malicious program. Worms, like Blaster, will also look for these open ports and attempt to infect your machine through them.

A firewall will block unused ports, and monitor those that are open to ensure only authorised traffic is allowed. In addition to blocking unused ports a firewall will also usually hide, or 'stealth', those ports, so even if a hacker program scans your IP address it won't see anything, and will hopefully move on to the next IP.

Windows XP Service Pack 2 has a built in firewall, which is adequate for basic protection, but it is not quite enough for total ▶



▲ **The firewall built in to Windows XP is adequate for basic protection, but it doesn't scan outgoing traffic.**

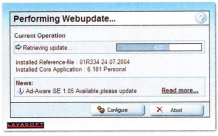
1988 Den Zuk are the first anti-virus viruses. They remove Brain.

1989 Dark Avenger.1800 released. Fast spreading, and dangerous.

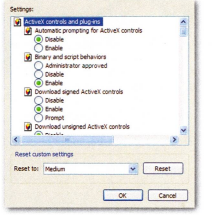
1991 Stoned variant, Michelangelo, is first detected.

1994 Kaos4 spreads over the internet via USENET newsgroups.

1995 Concept, the first macro virus, rapidly becomes world's most common virus.



▲ Like an anti-virus program, you need to keep your anti-spyware definitions up to date.



▲ Internet Explorer gives you plenty of control over what scripts you'll allow to run.

peace of mind. One major shortcoming of the Windows firewall is that it only filters incoming traffic. The firewall might prevent infection from a worm like Blaster, but if you do manage to get infected through another means, then the firewall will not block any outgoing traffic. This means your system could still become a zombie, and be used by a trojan to attack other systems or send out spam.

Most third party firewalls will protect you from a broad spectrum of attacks, and the main differentiator between them is their ease of use and their logging abilities. Ease of use is essential, as a firewall that is improperly configured is as good as having no firewall at all. It's also good to have detailed logging so you can monitor what kinds of attacks are coming your way, and adapt your settings as necessary.

The best way to set up your firewall is to start off being paranoid, and relax settings from there until all your applications work properly again. If you have a software firewall installed on your PC, it should alert you when an application is trying to gain access to the internet. You can then make sure that application is legitimate, such as if it's your email program or web browser, and give it access. Be warned, though, that some malware will simply rename itself and replace an executable with permission, so this technique is not fool proof. If your firewall doesn't give you these alerts, you have to do a little more homework and find out what ports need to be open for particular apps. Many of the most common ports are listed in the Common Ports sidebar.

well as the possibility of infection with a back door program that could come back and haunt you later. For these reasons, it's imperative that you get your email program secure and cover yourself against infection.

Most viruses still require you to execute a file to infect your PC, which means they still primarily appear as attachments. You should treat any executable attachments with extreme suspicion even if they're from known sources. This means any attachment with the extension of .exe, .bat, .com, .pif, .vbs and .scr should either be immediately deleted, or thoroughly scanned by your anti-virus program before being run. Also be very wary of compressed archives, such as .zip, .rar and .ace, as these

'To this day, the most common point of entry for malware, especially viruses, is your humble email program.'

Another type of firewall is Network Address Translation (NAT), which is commonly used on networks where you have a router. With NAT, your router has an IP address that is visible on the internet, but assigns your PC with its own IP address on your internal network. The router then acts as an intermediary between the internet and your PC, and only allows authorised traffic through. This is one of the best ways to secure your PC, and along with a software firewall, will give you the strongest measure of protection.

STEP 6 EMAIL

To this day, the most common point of entry for malware, especially viruses, is your humble email program. A single virus infection can truly ruin your entire day, and can cost you all the data on your PC, your bank balance as can have viruses buried within them that may not be immediately detected by your anti-virus program.

An even more troubling threat is viruses that can execute without you even opening the attachment. This can occur when you have the preview pane enabled in Outlook on a system that has not been properly patched. There was a vulnerability that enabled code to be executed from the preview pane, and this could infect your PC without any interaction from you. This is how the infamous Klez virus managed to spread so quickly around the world. While this vulnerability has been patched, it is possible that future vulnerabilities will be discovered that could use the preview pane to execute the virus. Although the risk is low, if you're looking for the best possible security, then you should consider disabling

TEST YOUR FIREWALL

Once your firewall is set up, you can test it online using one of these services.

HackerWatch.org
www.hackerwatch.org/probe

ShieldsUP!
www.grc.com/x/ne.dll?bh0bkyd2

PC Flank
www.pcflank.com

AuditMyPC.com
www.auditmypc.com/freescan/prefcan.asp

Sygate Online Services
http://scan.sygatetech.com

First Windows 95 virus, Boza, hits. It's not very potent.
1996

First Linux virus also appears, called Staog.
1996

Melissa virus spreads at unprecedented rate via email.
1999

LoveBug spreads via email, deletes files, and sends passwords to the author.
2000

Nimda strikes, attacking PCs at several vulnerable points simultaneously.
2001

▲ There are several worthy alternatives to Internet Explorer, such as Mozilla Firefox.

the preview pane in Outlook.

Another approach to increasing the security of your system is to change your email program all together. It's a sad fact that due to its popularity, Outlook and Outlook Express are prime targets of virus writers. By using an alternative email program, such as Eudora (www.eudora.com) or Thunderbird (www.mozilla.org), you can sidestep many of the biggest threats, but keep in mind no email program is 100 percent secure.

STEP 7 VIRUSES

Your first line of protection against viruses is having the proper security settings in your email program, but beyond that you also need to run anti-virus software. There is a wide range of anti-virus software on the market and, interestingly, the main difference between them is not necessarily their ability to detect viruses. Just about all modern anti-virus programs can very effectively detect and remove viruses from your system before they cause any mischief. However, most anti-virus programs are virtually powerless when confronted by a virus that is not represented in their definition files. These definitions contain the 'fingerprint' of thousands of viruses, and the anti-virus program works by comparing each file on your system to these definitions. This means the speed at which the anti-virus vendor can get a new definition out to you is vitally important. This is one of the distinguishing factors between large multinational anti-virus companies, as well as small local ones. The larger companies often have several offices around the world, so they're essentially always open and can react to a new virus faster.

When you're shopping for an anti-virus product, be sure to ask what their average response time is for new viruses and definition updates. You should also make sure the software has provision to automatically download and install updates whenever they are available.

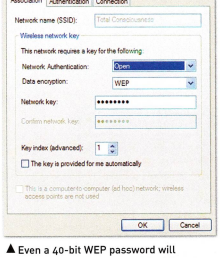
The other feature worth checking for is suspicious behaviour detection. If an unknown virus does manage to get on to your system before a definition is available, your anti-virus program may be able to detect that something is trying to send an email to your entire address book, or is trying to overwrite a system file. Even if it can't identify the virus, the anti-virus program could alert you to this behaviour, and you can isolate the infection before it takes hold or does any significant damage.

The other important distinguishing feature of anti-virus programs is their interface and configuration options. A poorly configured anti-virus program is no protection at all, and most anti-virus programs are not as secure as they could be straight out of the box. This means you'll have to get your hands dirty and fiddle with a few settings to make sure it's doing the best possible job. For example, some anti-virus programs don't automatically scan inside archives, such as .zip files, and others have heuristics, but don't enable it by default. As soon as you install your anti-virus program it's well worth working your way through all the options and enabling things like automatic updates, heuristics, email scanning, suspicious behaviour detection and archive scanning. You should then schedule the program to update daily and do a thorough scan of your entire system at least once a week.

STEP 8 SPYWARE

In the same way that anti-virus has become a staple on every PC, anti-spyware is also becoming a must have. Anti-spyware programs, such as Ad-Aware (www.lavasoft.de) and Spybot Search & Destroy (www.safer-networking.org/en/home) work in a similar way to anti-virus, and have definition files that can be downloaded and installed. The program will then scan your system for any known spyware as well as any traces, such as cookies. Also like anti-virus, anti-spyware programs are in a constant arms race with the spyware industry, which makes it essential to keep your definitions up to date.

Another way to protect you from spyware is to be vigilant when it comes to installing new software from the internet. Many spyware apps come as part of a package with other software, such as file sharing programs. Some of this spyware is legitimate in the sense that you are informed about it in the EULA (End User Licence Agreement) before it's installed. By agreeing to the EULA, you're agreeing to have the spyware install, and potentially monitor your online behaviour and send you ads. For this reason, make sure you at least scan each ▶



▲ Even a 40-bit WEP password will make your wireless network significantly more secure.

Anna Kournikova strikes using social engineering to encourage its spread.
2001

Worms increase in prevalence, including BadTrans, CodeRed and Sircam.
2001

Klez worm spreads, and becomes one of the most prevalent viruses in history.
2002

Bugbear also spreads rapidly, with many points of infection.
2002

Slammer infects approximately 75,000 PCs within minutes.
2003

licence agreement for any sign of third party software installed along with it, or for any privacy information. Some downloaded software, such as file sharing programs, won't function without the spyware being installed alongside, so if you're not satisfied with this, then hunt down an alternative – there are plenty to choose from that don't include spyware.

STEP 9 THE WEB

When it comes to security while you're browsing the web, we're going to revisit a common theme. Again Microsoft's popularity has made Internet Explorer a prime target for many web based threats, although things have been improved with the update in Service Pack 2 for Windows XP. At least now Internet Explorer includes a popup blocker, along with other essential security features such as tighter restrictions on cookies and ActiveX scripts.

Of course, another route is to abandon Internet Explorer and use an alternative browser, such as Firefox from www.mozilla.org. Firefox not only blocks popups by default, but you get the added functionality of tabbed browsing, and it's not as popular a target as Internet Explorer. This still doesn't make it 100 percent safe, however. In fact, Firefox has less security setting customisability, and only includes a couple of blanket options for download enabling/disabling, Java or ActiveX. Furthermore, as its popularity increases, there's a chance that more malware writers will explicitly target Firefox, so its popularity could actually make it less secure. For the time being though, it's a great option for the security conscious.

STEP 10 WIRELESS

The idea of broadcasting your network traffic over an area the size of a football field is not surprisingly disconcerting for many. Even so, there are still a huge number of insecure wireless networks. Ultimately, though, it's not that hard to lock down your wireless network, and make it all but impossible for anyone to penetrate it.

The first thing to do is enable encryption. The base level encryption included with 802.11a/b/g is WEP (Wired Equivalent Privacy), which is not 100 percent secure, although it's risks are often overstated. The problem with WEP is that with enough monitoring it's possible to break the encryption and guess the password, meaning a hacker can gain unrestricted access to the network. However, it takes several gigabytes of traffic before the hacker has enough data to break the encryption, and even then it's no trivial task. This means a hacker would have to really want to break in, and then would have to camp in range of your wireless broadcast and monitor traffic constantly for at least several days to get the volume of data they need. So, in short, WEP should be considered secure 'enough' for most home networks, although it's not recommended for any business networks. Even 40-bit WEP should be adequate for most homes, although if you want some extra protection, go for a 128-bit key. To bridge the gap between WEP and the new 802.11i protocol, a new encryption protocol was developed, called WPA (Wi-Fi Protected Access). This plugs the gaps in WEP by obscuring and rotating the key to make it all but impossible for a hacker to break it. Some existing 802.11a/b/g gear is upgradable to use WPA, which is a good idea if you want the best possible security. You will take a bit of a performance hit when using WPA, as the encryption algorithm is more processor intensive than WEP.

After encrypting your network, there are a couple of other things you can also do to make it more secure. The first is to disable the broadcast of your SSID, which is the name given to your wireless network. Normally this is broadcast for anyone to see, and if disabled then someone would have to guess the SSID in order to connect – even if the network is unencrypted.

The final measure of protection is MAC address filtering, which is a good idea if you only have a few PCs that regularly connect to the wireless network. The MAC address is the PC's unique network hardware serial number, and this can be entered into your wireless access point. This means only allowed MACs will be able to connect, all others will be rejected, even if they have the correct SSID and encryption settings. With a mix of 128-bit WEP or WPA, SSID hiding and MAC filtering, it would take one determined hacker to access to your network.

'When configuring Internet Explorer's security settings, you should have a security level of no less than Medium.'

When configuring Internet Explorer's security settings, you should have a security level of no less than Medium. Medium-low allows some web scripts to be run without prompting you, which is unacceptably dangerous. If you want to tighten things up even further, then you can customise the settings and get Internet Explorer to prompt you whenever any ActiveX or Java scripts are run. It's not recommended you use the High setting unless you just browse the web and don't use any media rich sites or download any files, as all these things will be disabled.

GO SHOPPING

Our April 2005 issue looked at the most popular all-in-one internet security suites on the market. It was a close race, but in the end F-Secure Internet Security 2005 took the award for its top blend of user-friendliness, features and price. Also, check out the near misses: Symantec's Norton Internet Security 2005 and Zone Labs' Zonealarm Internet Security 5.5.

SoBig one of the new breed that turns infected PCs into spam relays.

2003

Blaster worm targets Microsoft web servers with a distributed denial of service attack.

2003

annus horribilis of viruses.

2004

MyDoom, NetSky, Bagle, Sasser, Zafi all cause havoc on the internet.

2004

Already only half the number of infections than by the same time in 2004.

2005

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Build a digital jukebox PC

David Fearon shows you how to make a dedicated digital jukebox for less than the price of an iPod.

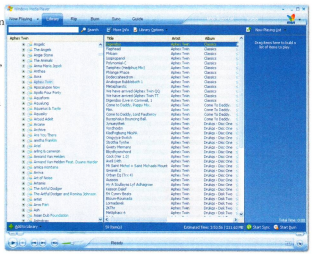
With computers as powerful as they are, even modest hardware is more than capable of handling digital audio, as long as it isn't doing too many other things at the same time. And with hardware that isn't super powerful comes a price tag that isn't super high. You can easily build a mini-ITX system for less than $750, and a price tag of around $500 isn't unheard of. This is especially true if you can use components such as the memory and hard disk from an old system. And that price includes the motherboard (including processor), case, power supply, memory and hard disk. All the software you'll need, aside from Windows XP, is free.

WHAT IS MINI-ITX?

Mini-ITX simply refers to a motherboard form factor; in other words, its standard dimensions and layout. However, the design, devised and mostly expounded by semiconductor manufacturer VIA, goes further than this in practice. Unlike standard motherboards designed to accommodate either Intel or AMD processors, VIA's EPIA series boards have a fixed, integrated processor, also made by VIA. Depending on the motherboard, these range in speed from 533MHz to 1.2GHz, and are x86 compatible. In other words, they can run all the programs that an Intel Pentium 4 or AMD Athlon 64 can and, of course, that includes Windows XP.

The only drawback is that they're slower, but still fast enough for many applications, including media playback and sharing. As well as the integrated processor, EPIA boards have, among other things, an integrated graphics adaptor, IDE interface, network adaptor, USB ports and an audio chipset, meaning the only things you need to add to produce a fully functioning Windows-compatible computer is a stick of RAM and a hard disk.

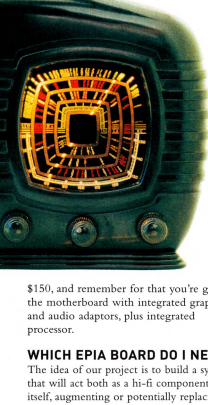
'The main requirement for running a media player isn't a fast machine; it's enough memory.'



▲ Windows Media Player 10 is free and can handle the ripping, organising and sharing of your music collection over the network.

THE ADVANTAGE BEING?

There are three, actually: size, noise and cost. Mini-ITX boards measure just 170mm on each side. The integrated processors consume less than 25W of power (as opposed to the 100W-plus of current Pentium 4 and Athlon CPUs), so they need far less cooling. In fact, the sub-1GHz boards need no fans – not even in their power supplies – so they run extremely quietly, the only source of noise being the hard disk. And the faster 1GHz and 1.2GHz Nemiah-core processors still only need a very small, quiet fan. The price of EPIA boards is also pleasingly low. A silent 600MHz EPIA C800 board costs only



$150, and remember for that you're getting the motherboard with integrated graphics and audio adaptors, plus integrated processor.

WHICH EPIA BOARD DO I NEED?

The idea of our project is to build a system that will act both as a hi-fi component by itself, augmenting or potentially replacing your current CD player, and a server to stream music to other devices in your house. The main requirement for running Media Player isn't a fast machine; it's enough memory, particularly if your music library is large. One of the concessions to size forced by the mini-ITX format is that the more modern boards have only a single DIMM socket (although the older EPIA 5000 and 800 boards have two PC133 slots), so you can't upgrade at a later date without discarding existing memory.

Going for a slightly cheaper board with an 800MHz processor, rather than 1GHz or higher version, and putting the money saved towards a 512MB rather than a 256MB DIMM is a better bet.

In fact, almost any of the EPIA boards on the market will suit our purpose. Take a look at the table above for an idea of the relative costs and features of the ranges. The M-series boards, however, have the advantage of six-channel audio and a digital S/PDIF audio output, giving them the most flexibility.

HOW TO CONTROL IT

Obviously, one of the main requirements for a music system is some sort of interface. EPIA boards have integrated graphics adaptors, so if you like you can simply plug in a 15in TFT monitor and pop it on top of your hi-fi stack, and there are any number of cool-looking mice and slimline keyboards around to partner it. One of our favourites is Logitech's DiNovo wireless Bluetooth mouse and keyboard combo.

However, you may feel that a standard TFT and keyboard doesn't look discreet enough in your living room. If that's the case, there are some esoteric alternatives. Although fairly thin on the ground, you can get smaller TFTs than the usual 15in models. At the time of writing, www.mini-itx.com had both 8in and 7in touchscreen displays, which will look discreet and, being touchscreens, do away with the need for a mouse. Or you can control the system remotely via another PC or notebook, via a Pocket PC or with a standalone media controller.

VIA PRICE LIST

Model	Price exc	Processor speed	Fanless	Number (type) of memory slots	S/PDIF digital audio output	Notable features
5000	$150	533MHz Eden	yes	2 (PC133)	no	TV-out
800	$160	800MHz C3	yes	2 (PC133)	no	TV-out
PD 6000E	$250	600MHz Eden	yes	1 (PC2100)	no	Dual network adaptors
M 10000	$230	1GHz Nemiah C3	no	1 (PC2100)	yes	Six-channel audio; DVD-Video acceleration
PII 12000	$330	1.2GHz Nemiah C3	no	1 (PC2100)	yes	Six-channel audio; DVD-Video acceleration; CompactFlash slot
MS 10000E	$320	1GHz Eden	yes	1 (SODIMM)	yes	Very low profile; no backplate; I/O via headers

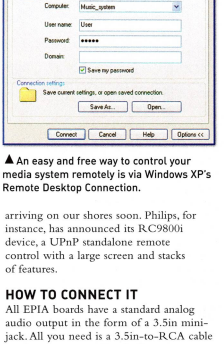
Note: prices are averaged across local and international vendors, and are likely to change from month to month. Before making a purchase, we encourage all readers to shop around.

REMOTE CONTROL

If you prefer to keep your media system headless (without a directly connected display), there are lots of options for controlling things remotely. At the simplest level, you can use the little-known Remote Desktop Connection feature included as standard with Windows XP. This allows you to control the entire system from another PC on the same network. The display of the remote server machine is simply transferred directly to the local client PC, with the mouse and the client's mouse and keyboard working as if they were directly connected to the remote machine. (It's hidden in the Programs | Accessories | Communications entry from the Start Menu.)

Probably the most pleasingly techie way to do it is to use a PDA as a wireless remote control. For this, you need a PDA running Pocket PC 2002 or higher, a wireless card for the PDA and an access point attached to the mini-ITX system (or somewhere on your network). For the control software, check out www.rudeo.com, www.kiwisrus.net/mediacontrol or www.zerama.net

Standalone hardware media controllers are just starting to become popular, since Windows XP now has proper support for the UPnP (Universal Plug 'n' Play) system. UPnP is great, as it's a clearly defined, open standard that allows network devices to interoperate without problems and includes specific support for media streaming and control. For now, there aren't many devices available, but expect to see hardware arriving on our shores soon. Philips, for instance, has announced its RC9800i device, a UPnP standalone remote control with a large screen and stacks of features.



▲ An easy and free way to control your media system remotely is via Windows XP's Remote Desktop Connection.

HOW TO CONNECT IT

All EPIA boards have a standard analog audio output in the form of a 3.5in mini-jack. All you need is a 3.5in-to-RCA cable to plug the output directly into a spare input of your hi-fi amplifier. You can use any input that isn't connected already – Aux, CD Player, Tuner and so on – except for the Phono input.

This is designed for the low output of a record player's tonearm, if you remember such things, and you'll get distorted sound if you use this and possibly damage your amplifier or speakers.

HOW TO CONNECT IT – THE HI-FI APPROACH

If you're more discerning and want the highest-quality sound from your media server, you can use digital audio instead, directed to an off-board hi-fi DAC (digital-to-analog convertor). There are a few ways to achieve this: if your EPIA board has ▶

▲ The EPIA MII 12000 is one of the highest-performing EPIA boards with a 1.2GHz processor, but it's still only 170mm on a side.

either digital S/PDIF outputs, you can take that output and pop it into a hi-fi DAC, and from there to your amplifier. If it isn't equipped with S/PDIF, you can still access your music in digital form by using an off-board USB sound card. Options include Creative's Sound Blaster Audigy NX and Philips' PSC805 Aurilium. The big advantage of the Aureon over the Creative or Philips cards is that it takes its power from the USB port, so you don't need to find another spare mains socket for an external DC adaptor.

It has both high-quality analog outputs for plugging into a hi-fi amp and S/PDIF for feeding it to an off-board DAC.

TARGET SYSTEMS

This table gives some sample costs for a media system. We've listed the cost of our project, along with a budget version and a fully kitted-out system, which assumes you're buying all the parts rather than reusing an old hard disk or RAM. Please note that Travla and EPIA board prices are based on international pricing from www.mini-itx.com. All other prices are average street prices.

SYSTEM TYPE	SPECS	PRICE
Budget system		
Case	Travla C158 (with 60W PSU)	$158
Board	EPIA 5000	$144
Memory	256MB unbranded PC3200*	$65
Hard disk	Samsung SpinPoint P80 80GB	$95
Optical drive	None	N/A
TOTAL COST		$462
PC Authority system		
Case	Travla C158 (with 60W PSU)	$158
Board	EPIA CL 10000 (replaced by PD 10000)	$256
Memory	512MB Crucial PC2100	$108
Hard disk	Salvaged WD1200	$0
Optical drive	Panasonic CW-8123-B	$163
Miscellaneous	Slimline drive adaptor	$25
TOTAL COST		$710
High-end system		
Case	Travla C158 (with 60W PSU)	$158
Board	EPIA MII 12000	$325
Memory	1GB unbranded PC3200*	$145
Hard disk	300GB Maxtor DiamondMax Plus 10	$299
Optical drive	Panasonic CW-8123-B	$163
Miscellaneous	Slimline drive adaptor	$26
TOTAL COST		$1115

NOTE: Because of supply and demand, PC3200 RAM is generally cheaper than PC2100 and work perfectly.

'There are several freeware applications that will let you share your music over the network.'

NOT JUST FOR LOCALS

The beauty of a networked mini-ITX music system is that you're not restricted to playing back your media via the directly connected amplifier or music centre: you can share it all over the house. There are several freeware applications that will let you share your music over the network – most use the UPnP standard. For sharing between computers, you can use On2Share's system (www.on2share.com), a free UPnP software plug-in for Windows Media Player. It works well for smallish libraries, but it does have the disadvantage that all your music is presented to the remote PC as a flat playlist, which isn't particularly convenient.

Another option is the PC version of Apple's iTunes, a free download from www.apple.com/itunes that has slick sharing via Apple's proprietary Rendezvous networking system. However, remember iTunes doesn't support music ripped in Microsoft's WMA format. It has to convert WMAs to Apple AAC before it will share them. MP3s are fine, though.

There's also a number of new UPnP hardware-sharing devices coming onto the market, although like remote media controllers they're still thin on the ground in Australia. Roku's SoundBridge is one option (www.rokulabs.com), and D-Link has a similar device (www.d-link.com).

They work via the WMC (Windows Media Connect) plug-in for Windows Media Player, which in fact is simply a UPnP server.

THE PC AUTHORITY MINI-ITX SERVER

So, our goal for this project was to put together a system that would look the part in our lounge room when partnered with a hi-fi separates system, with enough storage for an extensive music library.

The main decision we had to make was in our choice of case. We went for Travla's C158. This comes in several versions from www.mini-itx.com and looks great. We pulled a 120GB Western Digital hard disk out of a PC and partnered it with 512MB of RAM from Crucial.

Over the next two pages, we walk you through putting the system together. ▶

C3 VS PENTIUM M

A second alternative for building your own media system is to go for one based around an Intel processor. There's only one Intel-compatible mini-ITX motherboard that we know of: Insight's P4-ITX (available from www.mini-itx.com). This accepts Celeron and Pentium 4 processors, but only those based on a 130nm fabrication process and earlier. In other words, the newest Prescott-cored Pentium 4s and Celeron D processors aren't supported.

So which performs better? Well, while VIA's processors are perfectly adequate for media playback, they're not blindingly fast. A 1.2GHz EPIA MII 12000-based system with 512MB RAM scored 0.49 in our application benchmark, whereas the AOpen board fitted with a 1.6GHz Pentium M, the same complement of memory and a similar hard disk, scored 1.63. That makes it more than three times as fast and the match of many standard desktop systems. The trade-off is cost: the AOpen board and the Intel processors are more expensive than the VIA option.

There's also the fact that if you want as quiet a system as possible, you'll need to shell out on a silent, fanless power supply such as Antec's Phantom, whereas the low power required by EPIA boards mean they can be powered by much cheaper, fanless 'brick' mains adaptors.

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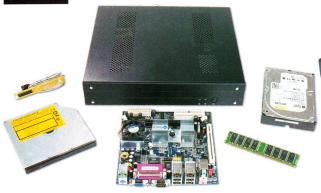
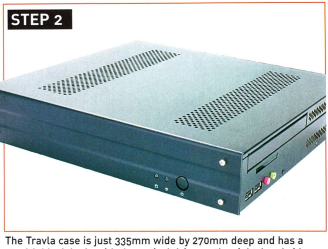
WALKTHROUGH: BUILDING YOUR SYSTEM.

STEP 1



We're using an EPIA CL 10000 motherboard running at 1GHz, partnered with a Travla C158 case, plus a 120GB Western Digital WD1200 hard disk salvaged from an old system, a 512MB stick of Crucial RAM and a Panasonic CW-8123-B slimline optical drive.

STEP 2

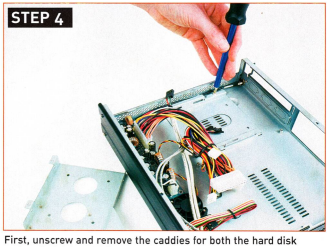


The Travla case is just 335mm wide by 270mm deep and has a stealth black look, with the optical drive on the right-hand side. It won't look out of place in your hi-fi rack, and it comes with brackets for wall mounting if you're so inclined.

STEP 3

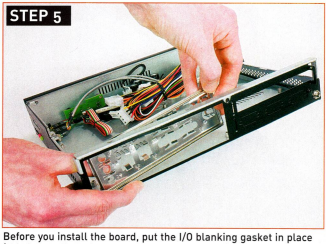
The Travla comes with an external 19V power supply, but also has some internal power circuitry to produce the required supply rails. You get a big loom of cable, most of which are power connectors, but there are also connectors for the supplemental USB and audio ports, plus fascia LEDs and power switch.

STEP 4



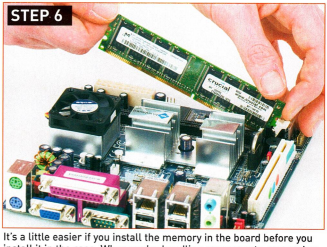
First, unscrew and remove the caddies for both the hard disk and optical drives. This allows you to attach the drives and install the motherboard.

STEP 5



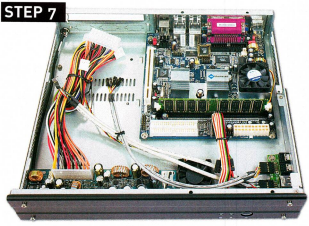
Before you install the board, put the I/O blanking gasket in place (this is supplied with the board since they vary). It's not essential, but it makes the system look a bit more professionally built.

STEP 6



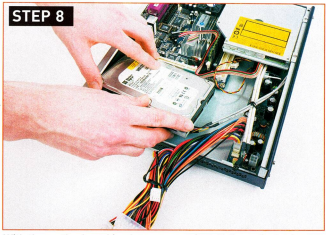
It's a little easier if you install the memory in the board before you install it in the case. When you're handling components, remember that they're static-sensitive. Ideally, you should wear a ground strap while handling them, but it's sufficient to touch a grounded object like the exposed part of a radiator pipe.

STEP 7



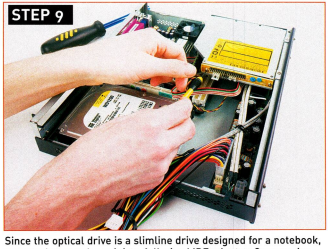
Installing the motherboard can be tricky if the I/O gasket's springy metallic earthing strips foul on the connectors. Bend them out of the way if necessary. Then, it's just a question of popping in four screws to hold it in place.

STEP 8



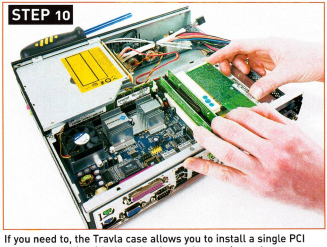
With the motherboard in place, you can install the optical drive and hard disks in their caddies. For clarity in this shot, we haven't attached the main power header (the 20-way white plastic connector), but that needs to be attached before you screw the optical drive into place.

STEP 9



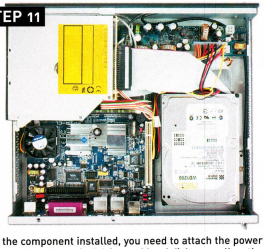
Since the optical drive is a slimline drive designed for a notebook, you need to attach a mini-to-full-sized IDE adaptor. Once you've done that, you must connect one of the spare white power connectors too.

STEP 10



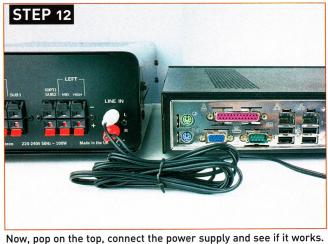
If you need to, the Travla case allows you to install a single PCI card. It does this with the help of a 90-degree riser adaptor to allow the card to be mounted on its side. It isn't required for our project, but it works like this.

STEP 11

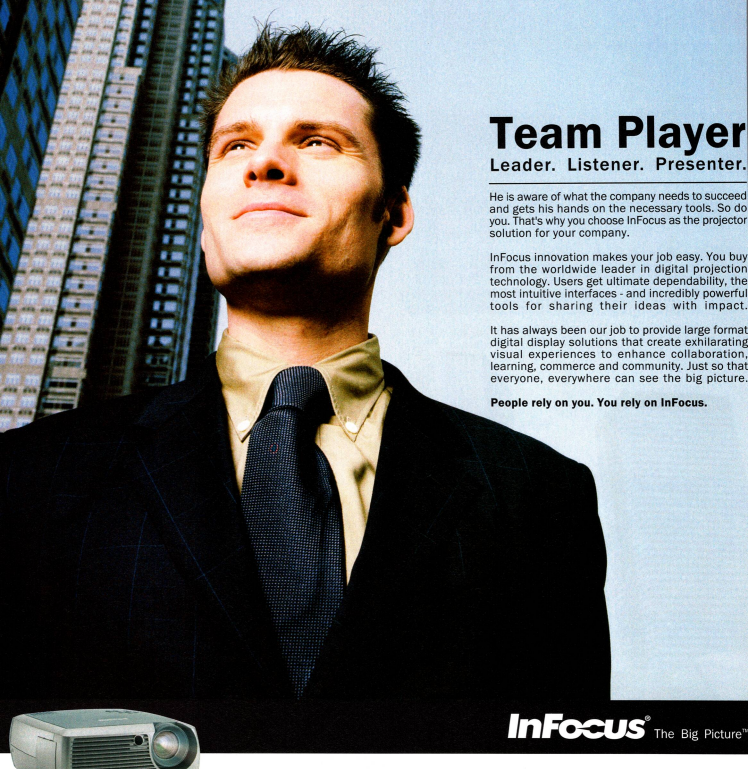


With the component installed, you need to attach the power connectors to the optical drive and hard disk, as well as the IDE cables and any of the motherboard headers you want, plus the connector for the power and hard disk LEDs and power-on switch. It's a difficult job, but it pays to get it looking neat.

STEP 12



Now, pop on the top, connect the power supply and see if it works. If not, take the top back off and check the connectors are pushed home firmly and that the RAM is properly in place. Next, install Windows and any other software you need and connect the audio output to an amplifier. ■



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Blue skies on dull days

Don't let a dark sky ruin a perfectly good photo. Gordon Laing shows you how to brighten up images with a blue sky.

There are few things that spoil a photo quite like a white, featureless sky. Overcast conditions are the bane of landscape photographers, and they're particularly infuriating if you don't get a second chance to visit a location under better conditions. Better doesn't necessarily have to be a deep blue sky, though. Coloured sky and clouds of any description, be they bright and sunny or dark and stormy, are equally good at making an interesting composition.

So why do skies end up looking washed out? In some cases, it's an accurate reflection of the conditions, but at other times the sky is blue and the sun is out, yet the image still suffers from a vast expanse of white.

The problem is often due to the direction you're pointing when you take the picture. With the sun behind you, there's no problem, but as you turn even slightly the combination of increased haze, wispy clouds and a brighter sky begin to cause problems.

As the sky brightens, you're stuck in a Catch-22 situation, where your exposure can either be right for the sky or right for the ground, but not both. If you meter for the sky, the foreground will be too dark, and if you meter for the ground the sky will become washed out. Unless the sky is a spectacular sunset and you're happy with a silhouetted foreground, the best compromise is to expose for the ground and accept an over-exposed white sky.

Although thanks to digital manipulation, it's possible to have your cake and eat it. In this workshop, we'll explain three techniques for reinstating attractive blue skies to previously washed-out areas. We've used Adobe Photoshop CS in the examples, but the techniques are simple and can be achieved in almost any photo-retouching program. They all essentially involve selecting the existing sky area and either enhancing or replacing it.

The first technique fills the plain sky area on a photo with a smooth coloured blend from blue to white at the horizon. The easiest way to do this is using a basic gradient fill. To avoid looking like solid colour, the fill can be made slightly transparent to allow existing detail such as wispy clouds along with electronic noise to show through. Even though this can be quite effective, it's best used on photos where the sky occupies a third or less of the total area.

The second technique is for photos that already have a faint blue sky, but not as deep as you'd like. Here, you select the sky area and perform whatever adjustments you like to make it look better, while leaving the foreground untouched. Great results can be had by selecting a pale blue sky and making it a little darker.

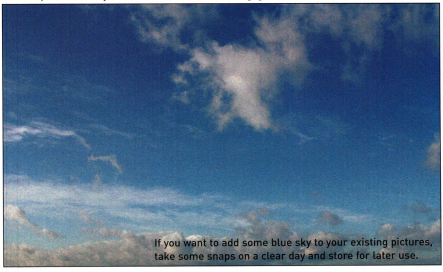
The third technique is for photos where there are large expanses of featureless white sky. Here, the sky area is too big for a gradient fill to look convincing, and there's literally nothing to darken or enhance. The best trick is to copy an area of blue sky taken under better conditions and simply paste it into the white sky area on the photo.

To give yourself the maximum number of options, it's worth building up a collection of sky shots with and without clouds and under a variety of conditions. This way, you'll always have the perfect background for photos lacking sky detail.

SELECTIONS

Clearly, all three techniques rely on accurate selections of the existing sky area. A poor selection could leave gaps or a thin outline around objects against the sky, leading to unconvincing results. In each case, we've relied on the Magic Wand tool to grab the desired area, then tweaked the selection by hand.

Sometimes, this simply involves picking up extra areas missed by the Wand, performed by Shift-clicking in Photoshop, or subtracting others using Ctrl and click. At other times, a tighter and better-looking selection can be made by simply expanding the existing one by a single pixel using Photoshop's Modify command under the Select menu. We provide three routes to the perfect sky over the next two pages. ▶

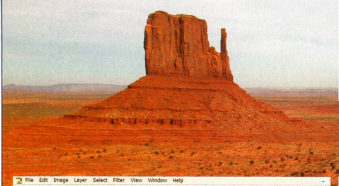


If you want to add some blue sky to your existing pictures, take some snaps on a clear day and store for later use.

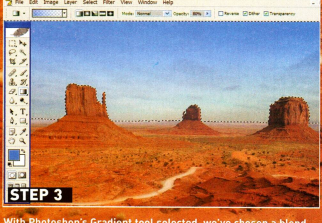
THREE ROUTES TO THE PERFECT SKY

STEP 1

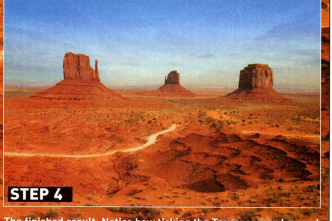
This shot of Utah's Monument Valley looks a little dull, thanks to its overcast sky. There wasn't much detail in the sky to start with, but by exposing for the ground the already bright sky has become completely washed out. Luckily, a solution is only a few clicks away.



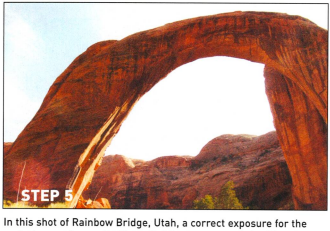
In theory, all you need to do is select the sky area and fill it with something nicer. To look more realistic, we're using a graduated fill with slight transparency to preserve any existing sky detail. The first step is to select the sky. We've used the Magic Wand tool.



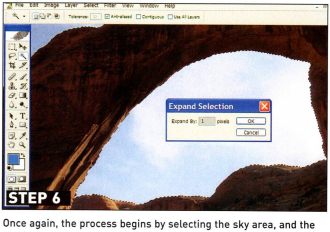
With Photoshop's Gradient tool selected, we've chosen a blend from the foreground colour to transparent from the pull-down options. After choosing a nice shade of blue from the colour picker, drag a vertical line down from the top to the horizon and there's your sky.



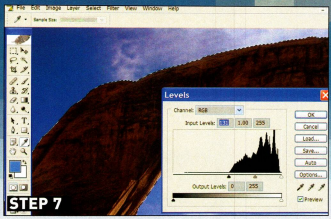
The finished result. Notice how ticking the Transparency box and reducing the Opacity option in the previous step has allowed what little existing sky detail there was to show through our blue gradient. This has made the result look much more convincing.



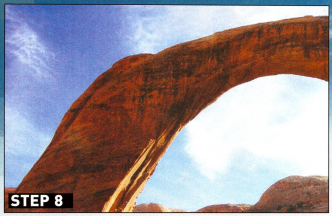
In this shot of Rainbow Bridge, Utah, a correct exposure for the rocks has again resulted in a slightly overexposed sky. There's nice detail in the sky here, but it should be a darker shade of blue. So rather than creating a new sky using a gradient, we'll optimise what's there.



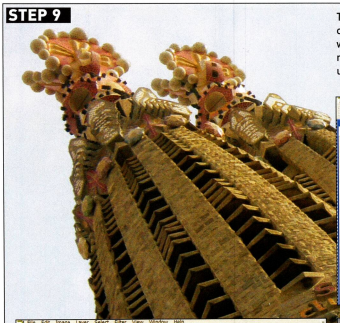
Once again, the process begins by selecting the sky area, and the Magic Wand tool is probably the most effective. If you find your object has a thin white line around it, it can be worth expanding the selection by one pixel. This can be found under Modify on the Select menu.



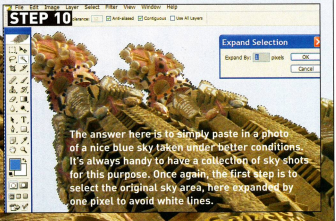
With the sky area selected (including the area under the bridge), experiment with various adjustments until it looks the way you'd like it. Above, we've used the Levels command under the Adjustments menu to stretch the tonal range and make the blues much deeper.

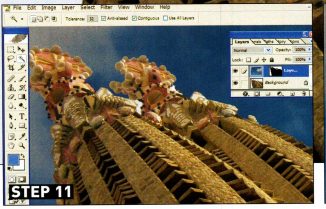


The final result with a darker sky. The success of such manipulations depends on the accuracy of your selection and the degree to which you change the sky. Try to avoid the temptation to go over the top and make it too dark. Subtle changes are usually more convincing.



This photograph of Gaudi's Sagrada Familia in Barcelona is crying out for a big, impressive sky. Sadly, once again, overcast weather has left us with a large expanse of white. Here, there's nothing much to enhance and too much space to convincingly use a gradient fill.





Now open your desired sky photo and adjust it to better match the contrast of the main image; we've slightly lightened the sky. Next, Select All, then Copy the blue sky. Switching back to the image of the building, choose Paste Into from the Edit menu.

The Paste Into command simply pastes whatever's in the clipboard into the selected area; in this case, our nice blue sky over the uninspiring white sky. Some sky backgrounds may work better than others, so experiment with the images in your collection. ■

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THUNDERBIRD IS GO!

Jon Honeyball finally ditches Internet Explorer in a month that sees significant changes in his work patterns.

I decided it was time to make some changes to my network and to the day-to-day methods of working. I'd come to rely on certain pieces of essential software, but with the arrival of the new year it seemed like an appropriate time to get out of the rut and try something new. As well as this, I thought it would be a good time to take stock of the corporate computing world, its needs and pressures, away from the needs of the SOHO marketplace. To challenge the way you've been working and discard the software you habitually use is a big step, a bit like taking a leap into the dark.

The first thing to go was Internet Explorer. I've never held much love for this browser anyway. The way Microsoft tied it into the operating system was a brilliant move. Reusing its HTML rendering engine within various other applications like Word was a classic example of how to recycle common code. The downside of this brilliance, however, was that it became clear that Microsoft had underestimated the sheer intensity and persistence of malevolent attacks that would come to be launched against even the humblest laptop. I remember with amazement that back in the late 1990s I didn't bother running a firewall – there was no need. Nowadays, we've retreated behind a battlement of NAT with no incoming routes, and then decided that wasn't enough on its own and so have firewalls in place behind it as well.

Once IE had reached versions 5 and 6, it was clear that Microsoft regarded HTML rendering as being a done deal: the whole world used IE6, it worked pretty well and the developers decided it was time to move on to more interesting things. Unfortunately, that's when the cracks started to become visible. With the release of SP 2, Microsoft has plugged most of the holes, but the explosion in spyware, adware and other malware still leaves me wondering whether IE is worth the effort – it isn't. I've therefore decided to lock IE down as hard as possible, using the technology and mindset from the server product.

'Should you nail Internet Explorer's head to the coffee table and install Firefox? ... Yes, but with provisos.'

On Windows Server 2003, IE is locked down so hard that you can't browse the internet with it at all; exceptions include a handful of trusted websites. I've basically adopted the security mindset and applied it to XP SP 2.

Given that I'd locked down IE6, I obviously now needed a web browser for my day-to-day use, and the one I've chosen is Firefox, on Mac and PC. This is an exceptionally good web browser – solid, reliable and straightforward – and I'm happy that there aren't any known nasty OS vulnerabilities being exposed by its use. Firefox works just fine for me on all the websites I regularly visit, as nowadays it's a rare site that still contains IE6-dependent code. For such sites, I can fire up a Virtual PC and bring up a naked copy of IE6 to complete my browsing. Shutting down that Virtual PC session and discarding any changes made while it was running is a great way of ensuring that nothing nasty has managed to creep into the machine.

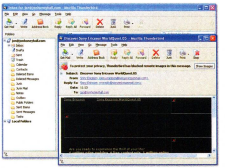
So that's my web browsing taken care of. For my email client, I've made the radical move of abandoning Outlook. Both Outlook and Outlook Express are terribly misunderstood products. I've never really had much time for Outlook Express, viewing it as a slightly dim cousin to Outlook, but then Outlook itself has a slightly schizophrenic personality too. Outlook only makes any sense as a client for Microsoft Exchange Server, and in that role it's superb, which is hardly surprising as it was designed for exactly that purpose. This is especially true of the latest version.

▲ Another day, another set of anti-spyware definitions from Microsoft.

However, I decided to wean myself off Outlook because I was using almost none of the advanced functions, and most of the clever stuff that I did need was being handled by the Exchange Server back end anyway.

This left the obvious question of what email client to adopt. For a start, it had to have strong IMAP4 capabilities; it had to be robust and reliable and be able to cope with a few gigabytes of offline email without falling apart at the seams. In the end, after much exploration and tasting, I went with Thunderbird, the sister product of Firefox.

It seems to be robust and easy to use, but mercifully it doesn't attempt to be too friendly



▲ The Thunderbird email client is straightforward and very powerful.

by glossing over the details of how email works. I like the power and flexibility that it gives me and, to be honest, I also like the way it doesn't, unlike Outlook, tie me into Active Directory and the complexity of its address books and other internal plumbing.

It's clear that there are three big questions to be answered before I can go on any further, so let's tackle them head on. First, am I recommending that you should follow suit? Should you nail IE's head to the coffee table and install Firefox? Am I recommending that you ditch the Outlook client and move over to Thunderbird? The answer to this is 'yes, but with provisos'. If you're a large corporation, you have a huge investment in client training and ease of use, which you must never underestimate – moving even from IE6 to Firefox is almost certainly not worth the upheaval. What's more, in a large corporate environment, the weaknesses of IE6 ought to be restrained by adequate network administration; you won't be allowing unrestricted and unmonitored internet access by any tool; and all HTML content coming into ▶

the site will be carefully scrubbed by content-cleaning tools. In short, the risk profile is greatly reduced. In the SOHO/SME environment, things aren't so clear cut, and I'm enjoying my use of Thunderbird and Firefox, especially because they work identically across platforms – useful to those odd people, like myself, who believe the best laptops are made by Apple.

Now for the answer to the second big question: both Thunderbird and Firefox are open source applications, and you can download their source code if you wish. Making improvements is encouraged, as this is, after all, a community effort. So do I feel empowered by the fact that both of these applications are open source? Yes and no. Yes, I think improvements will come through quicker. By 'improvements', I don't simply mean bug fixes, but whole new versions, new features and new add-ons. Do I think bugs will be fixed sooner in Thunderbird than in Outlook? That's impossible to predict, and only history will be able to answer, but both products do have routes for the rapid distribution of updates and fixes. But, most importantly, do I get a warm cuddly feeling that I can and go browse the source code, compile up my own version and fix something that annoys me? Not in the slightest. That side of things leaves me completely cold. The reason is simply that I don't have time to learn the source tree of such major products. And since I don't have the knowledge of what's going on in the code, it makes it hard to fix anything in a controlled and productive fashion. Of course, I'm delighted that there are others out there who have wrapped their heads around both Outlook and Thunderbird, but it doesn't matter to me whether they're in Budapest or Redmond, provided they generate a stream of fixes and improvements.

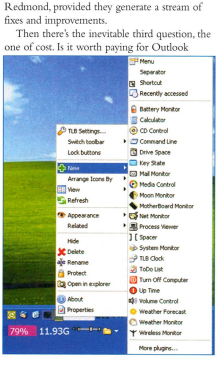
Then there's the inevitable third question, the one of cost. Is it worth paying for Outlook when Thunderbird available for free? The answer to this revolves around your use of Exchange Server. If you're currently employing shared calendars, contacts and all the rest of the groupware capabilities that Exchange Server has, you'll undoubtedly feel that Microsoft's server licenses and client CALs are worth the money, but if you merely treat Exchange Server as an intermediate mail server and do nothing with the rest of its features then there's a significant cost saving to be made here. For the time being, I'm going to have my cake and eat it.

I love what Exchange Server brings to the table, and that won't change. But, for the time being, Outlook has been taken off my radar along with IE. And despite this major change, I'm becoming quite a fan of Microsoft's AntiSpyware tool *(see May, page 61)*. Although it's only in beta, it's reliably checking my machines every night and seems to be pulling down updates quite frequently too. Given the combination of a good anti-spyware engine, coupled to a strong anti-spam engine for email, the need for intrusive and performance-sapping anti-virus software is much reduced. It isn't pushed away for all time, but most of the nastiness that I receive is in the form of attachments to email messages, and a strong anti-spam engine rids me of those.

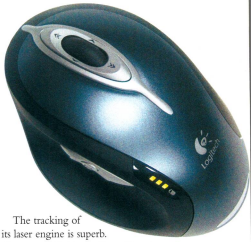
LOGITECH LASER MOUSE

I've even changed my mouse, which is not something I do lightly. I find many of the ones available today either too big, too heavy and too awkward, or else too small, fiddly and otherwise generally unpleasant. However, a friend told me about the new Logitech laser mouse, so I decided it had to be worth a look. There's no doubt that the red LED sensor technology employed on most mice these days was a big step forward from the rolling ball (if we ignore those LED pattern-reading mice that were used on early Unix workstations and which required you to have a mouse mat with graph-paper printed on it to work). But Logitech has gone further still and now uses a laser to illuminate the surface over which the mouse is rolling: because of the coherent nature of laser light, it's claimed to give up to 20 times the accuracy in reading the surface over which the mouse is moved. All of this might well be true, but the proof is in the pudding.

The new Logitech MX 1000 laser cordless mouse is a typical full-function mouse absolutely covered with buttons. The scroller wheel tilts to either side as well as rolling, and there are even up and down buttons placed around that too. Despite the overkill, it still fits well in the hand. At night, you're supposed to park it on its radio base unit to recharge the batteries, but I've had few problems in two or three days of heavy use.



◀ True Launch Bar may add functionality that your machine has been waiting for.



The tracking of its laser engine is superb. On my oak-finished office tables, the mouse tracks reliably and is clearly of finer definition than the previous red-LED incumbents. It's hard to be certain whether this is actually due to the laser or not, but what's clear is that its action is very fine, with excellent ballistics, which, at the end of the day, is what matters. Indeed, its fine movement action is so good that some friends who are serious Photoshop users have reported how it's transformed the accuracy of their pixel-level work, which can't be a bad thing.

TRUE LAUNCH BAR

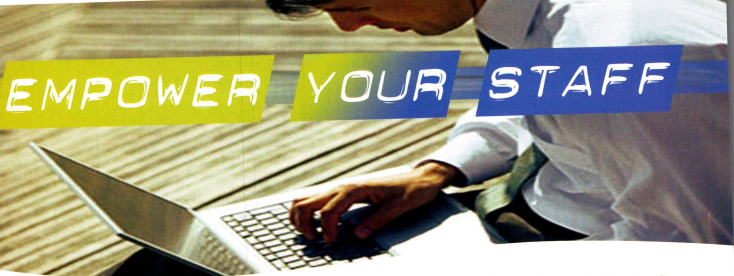
I don't usually go for Windows add-on utilities that fill up my screen or clutter the taskbar by telling me all sorts of useful, or useless, info. I find them to be too inflexible, or else they cause system stability problems or other undesirable issues. But I'll confess that I have given some Desktop space to True Launch Bar recently.

This is a replacement for the quick launch bar in Windows, which allows you to do all sorts of useful things like putting items into groups, adding new functionality and applets and so forth. The list of add-ons that you can download from the website at www.truelaunchbar.com is most impressive: a battery monitor, calculator, CD control panel, DOS command line, drive space, key state, mail monitor, media control, moon monitor, motherboard monitor, net monitor, process viewer, clock, to-do list, uptime, wireless monitor – and the list goes on. Getting each of these to run is trivially simple, and you can switch between sets of them.

Some are better suited to be floating on the Desktop, or you might want to spin out other menus for them to be used within. I recommend you use this on a higher-resolution screen than a small, cramped laptop, but it's a useful tool that might well appeal to those who like to fiddle with their Desktop. ■

ON THE COVER DISC:

You'll find Mozilla Firefox, Thunderbird and True Launch Bar on this month's cover disc. For more information on these apps, see www.mozilla.org/products and www.truelaunchbar.com.



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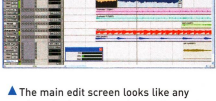
CONVERGENT EVOLUTION

Brian Heywood looks at how current audio production software is actually the culmination of three distinct music-technology threads.

Take a good look at how music technology has developed, and you'll trace three evolutionary paths of music and audio production software. The first is the MIDI sequencer, as characterised by applications such as Cubase and Sonar. These have all evolved from Sequencer Plus, the original DOS professional MIDI recording and editing software released by Voyetra in the 1980s. Using this tool, musicians could compose and alter their work with a powerful set of editing tools and hear their compositions played by a wide range of MIDI synthesisers. As the power of the PC and the capabilities of the interfaces increased, audio capabilities were added to create the current crop of MIDI and digital audio sequencers.

The second thread has evolved from the DAW (Digital Audio Workstation) or non-linear audio editor. 'Non-linear' means you can instantly jump to any chosen point in the audio stream you're editing, which is in contrast to tape-based systems where you had to wind through the tape to get to the bit you wanted to re-hash. These hard disk-based DAW systems were often built around dedicated hardware controllers and designed for putting together film soundtracks or CD mastering: being targeted at the needs of the film soundtrack, they often included features such as automatic dialogue replacement and CEDAR noise reduction. This part of the video-production cycle is known in the business as 'audio post', which is simply an abbreviation of 'audio post production'. The best-known PC-based DAW system is Digidesign's Pro Tools, which employs a combined hardware and software system, and has become something of an industry standard. Other players in the field are Sound Forge, SAW, Creamware (tripleDAT) and Syntrillium (formerly Cool Edit), which originally targeted the budget end of the market but ended up as pretty much the standard in the world of radio.

The final strand of the thread is the loop-based audio application such as Sony's ACID, Garage Band and Ableton Live. Conceptually, these products probably derived from hardware audio samplers (the Akai 1000, for example) with some music-tracker software techniques thrown in for good measure. These programs are an example of how a little musical knowledge and some clever programming can overcome the shortcomings of computer hardware. The original tracker was developed for the Commodore Amiga, which had built-in sample replay hardware in the shape of four channels of 8-bit audio. However, shortage of memory on the Amiga and the limitations of its built-in audio hardware meant that the only way to make a sensible musical noise was to repeat short sections of audio data. The software became more sophisticated as the hardware improved, perhaps reaching its peak with OctaMED, which allows 16-bit playback on eight channels. Music produced using tracker software had a highly characteristic feel to it and was often used as the background music for console games and also for PC game soundtracks.



▲ The main edit screen looks like any number of other sequencing packages, but it hides a different way of working with the audio files.

'...if you have a lot of tracks fading at the same time it will cause the processor loading to spike, leaving less computer power available...'

DIGIDESIGN PRO TOOLS

Like Voyetra, Digidesign has been around since the beginning of the PC music revolution. The company started out in 1984 as Digidrums, designing and selling custom drum sample ROMs for the, then new, crop of digital drum machines such as the Linn and Drumulator. A year later, it released Sound Designer, a sample editor for the E-MU EII sampling keyboard and then went on to release SoundTools in 1989, rather immodestly described as the world's first 'tapeless recording studio'. Digidesign has always tended to sit in the Apple Mac camp of music software, although it has often serviced the PC world with excellent products such as the Session 8 hard disk-recording system and SampleCell – a high-specification music sampler on a PCI expansion card. In 1995, the company was bought by Avid, the producer of one of the high-profile digital video-editing systems, which set the scene for all the subsequent acquisitions of audio software developers by video companies – Steinberg by Pinnacle, Syntrillium (Cool Edit) by Adobe and so on.

Digidesign has always pushed the technology envelope and hasn't been afraid to produce its own hardware to give the software a performance edge. Sometimes this left the company looking somewhat silly, as was the case when it launched a product during the mid-1990s to a room full of high-powered music-technology journalists, who all watched the system crash and burn with a certain amount of wry amusement. This is a problem that any company working at the bleeding edge of technology will experience from time to time.

Pro Tools, like a lot of the software packages developed for audio post applications, uses a non-destructive editing scheme, which means it doesn't directly alter the audio when you edit it onscreen – it simply creates a new EDL (Edit Decision List) entry that describes what you've done to the audio. This EDL is just a list of instructions that tells the DAE (Digital Audio Engine) what to do when you play back the edited audio. This means the software doesn't have to copy large chunks of audio data whenever you perform an edit as the actual work is performed only once you hit the playback button. The upshot of this is that the Digidesign software can wring the last ounce of performance out of your computer's hardware. This technique of using EDLs was borrowed from the analog film and video-editing, where the online video-editing suite was controlled by the contents of the EDL, performing the edits on the original video masters to ensure that the highest audio and video quality was maintained.

The internal data structure of the EDL simply notes the start point and location of the audio data for each edit. I know this because I recently had to transfer a Pro Tools session between a Mac and my PC-based Soundscape. This wasn't a problem, as the Soundscape SSHDR-1 software can import Pro Tools sessions – at least for sessions created by versions 3, 4 and 5 of the Digidesign software. It turned out that the Pro Tools software on this particular Apple system had saved all the audio as 32-bit files, rather than the studio standard (24-bit) or the CD standard

▲ The mix window lets you automate the mix and add RTAS audio processors, such as EQ and other effects.

(16-bit). In fact, all I needed for my application was 16-bit quality, so I wanted to 'down-sample' the source audio to the lower bit depth (or sample size). Considering the way that Pro Tools operates, I simply located the source audio files and used Cool Edit Pro to batch convert the audio files to the lower resolution, which worked a treat. The EDL references the edits by counting the samples, and since I hadn't changed the rate that didn't affect the edit points one jot.

NOT FADE AWAY

In fact, Pro Tools takes a hybrid approach to non-linear editing. While competing audio post systems such as Studio Audio's SADiE and Sydec's Soundscape perform all the edits in real-time, Digidesign software creates separate files whenever you do a fade or a cross-fade. This obviously stresses the machine more during the editing process, but unless you're doing an outrageously long fade you probably won't notice the performance hit. The additional storage overhead of keeping the fades as separate data files is also going to be minimal for virtually all sensible applications. The advantage of this approach is that the computer doesn't have to perform the calculations to implement the fade during playback, simply to reel off the pre-calculated fade segment.

While the audio fade calculation is relatively trivial, if you have a lot of tracks fading at the same time it will cause the processor loading to spike, leaving less computer power available for running audio effects processing plug-ins such as reverberation, equalisation and so on. Without this approach you could get into the situation of mixing a track where you're pushing the computer to its limit, only to find that the whole thing falls apart when the playback hits the final fade, which might involve a large number of separate audio tracks, and hence fade calculations. The Digidesign approach avoids this by doing these calculations in advance.

The user interface of Pro Tools looks pretty much like a conventional sequencer with a track (or arrange) display, a tape-style transport control panel and a separate mixer window. Digidesign has developed its own terminology, with the basic arrangement or project being called a 'session' and all its associated audio, fade and EDL files being stored in the Session folder. This means you can easily backup or transfer a session between computer systems with the minimum of fuss, which is a requirement in the pro video world where the editing may take place in a variety of locations. The segments of audio and MIDI displayed in the Pro Tools Track display or Edit window are called Regions, and are just a graphical representation of the contents of the Pro Tools EDL or session file. This window provides tools for altering the length of the audio regions, subdividing and looping the audio, as well as drawing-in track automation and determining how the tracks and audio data are to be displayed. There's also a text Region list that lets you either select and rename an individual region or drag it directly from the list into the session's arrangement – useful if you're trying to find a particular audio take within the arrangement.

The Mix window lets you control and process the output from each track, and it's modelled on the familiar analog mixing desk channel strip. As well as the audio tracks, you can create additional control channels, such as a master level control and auxiliary, which then appear in the Edit window. These control tracks can be used to automate the mix channels by drawing in the volume profile or by Pro Tools memorising any changes you make to the levels during playback.

As well as the familiar channel fader control at the bottom of each strip, you can add audio-processing plug-ins to give either in-line or insert processing, say, dynamics control (for example, compression) or equalisation. Alternatively, you can send a portion of the signal to an auxiliary bus for ambient effects such as reverberation and delay. The supplied effects plug-ins employ Digidesign's RTAS standard, which means they're non-destructive, so you can tweak them during playback. The number of plug-ins you can run simultaneously will depend on how powerful your PC is and how much of your PC's processing power you want to allow Pro Tools to use (up to 85 percent).

OPEN THE MBOX

I've been looking at Pro Tools LE 6.4, which uses the Mbox external USB audio interface. The Mbox is a compact, two-channel interface designed to form the basis of an entry-level Pro Tools system. It has line-level, instrument and microphone inputs with selectable phantom power, as well as a line-level stereo analog output, S/PDIF (electrical) connections, and insert points that allow you to break into the audio signal path between the preamps and the analog-to-digital converters. This feature lets you insert a signal conditioner, such as a compressor or limiter, to tame wayward audio levels, and shows the professional approach that Digidesign has taken to the design of this unit. The interface is powered entirely from the PC's USB port, which means that it can't be connected via a passive USB hub. There are two headphone outputs with both jack and mini-jack sockets (although only one can be used at a time), with a separate volume control.

The analog-to-digital and digital-to-analog converters are 24-bit and can operate at either 44.1kHz or 48kHz sample rates. The USB port used is to the slower original 1.1 standard, which means that there's a significant latency delay when recording and monitoring using the Mbox. As with many interfaces of this type, there's also a zero latency monitoring facility that lets you mix the analog input signal with the computer playback so you can monitor as you record, avoiding the double delay caused by the signal having to hop down the USB cable to the computer and then back again.

▲ The transport controls hark back to the days of tape, but provide a convenient way to control recording and playback.

PRO TOOLS FOR FREE

You can download a free hardware-independent version of Pro Tools from the Digidesign website (www.digidesign.com) for both the PC and the Apple Mac (OS 9 only). The free software is a version of Pro Tools 5 (6 is the current version), which has been limited to eight audio tracks, but it's supplied with a number of effects plug-ins. The software will use your PC's own sound card for recording and playback, so you can exercise every aspect of using the software. It will also read and write Pro Tools session files so you can swap projects between it and other Pro Tools systems, albeit within the stated track limitations.

The free version of Pro Tools looks and feels like its more powerful siblings and provides a perfectly usable system for audio production.

The installation files and documentation are available from the download page, which can be found by clicking on the Support menu option. You'll have to register your details with Digidesign to access the download page, but it's worth it as it does allow you to get a free taster of the software. The PC version was made available before Windows XP was released, so its target OS version is Windows 98 SE or ME, and you'll need to have at least 128MB of free RAM to install and run it.

PHOTOGRAPHIC SAFARI

Got more photos than you know what to do with? **Leigh Dyer** explains how Linux can help.

Digital cameras are everywhere these days. Just about everyone has one, and with prices on them dropping to pretty ludicrous levels, the three or four people out there who still don't have one probably won't be far behind the rest of us. Even if you don't actually want a digital camera, there may be no escape in the near future, with PDAs, mobile phones, and other devices all incorporating camera technology at a crazy pace.

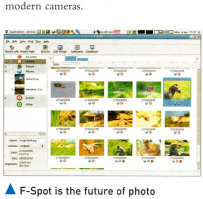
We're all drowning in photos, from that exciting visit by Aunt Gladys on the weekend, through to the 76 photos of the cat playing with an empty toilet roll that it found rather amusing, but don't worry – I'm here to help.

DIGITAL CAMERAS AND LINUX

I could go on for a bit about getting photos off your digital camera under Linux, but it's basically a non-event these days. The vast majority of cameras available today connect to PCs as USB mass-storage devices, just like a USB flash key, so any modern Linux desktop system should automatically detect and mount your camera's filesystem as soon as you plug it in.

Recent GNOME systems even fire up a photo import wizard for you, which will automatically copy your photos in to your home directory.

If you've got a camera that uses custom protocols, like my old Canon Powershot A10, you can probably get it working using gphoto2 or one of its frontends. I used to do this, but these days I use a USB card reader – it saves my batteries, and I get the same auto-mounting goodness as people with more modern cameras.



F-Spot is the future of photo management under Linux.

WHEAT AND CHAFF

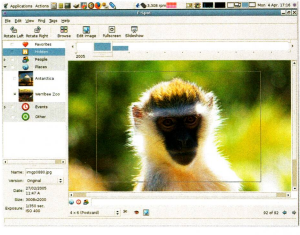
Once you've got your photos on your PC, you need to view them, sorting out the good from the bad. Both the GNOME and KDE file managers give you thumbnails views of your images, so they're not a bad place to start, but you're much better off using a nice dedicated app like gThumb. It can thumbnail the images in a folder, letting you browse through them, or flick through the full-sized images one-by-one.

The future for Linux image cataloguing though is an app called F-Spot. It's being written by the ex-Ximian hackers working at Novell, and as you'd expect from them, it's written in C# and runs on the Mono .NET runtime. It's still quite young, and a bit rough around the edges, but it's already looking very impressive. If you want to give it a go, you'll find packages in Debian unstable and the new Ubuntu release (5.04, aka Hoary Hedgehog), and unofficial Fedora packages in the Dag Apt/Yum repository.

F-Spot concerns itself mainly with categorising images, which it handles through a neat tagging system. Put simply, you create named tags, which you assign to each image. The tags exist under four root tags: People, Places, Events, and Other; and there are Favourite and Hidden tags to assign as well. Later on, when you're browsing for a certain shot, you can use the tags to filter the images, so you can easily pull up all the images of your friend Bob, or of your last zoo.

F-Spot also has some basic image editing facilities, such as red-eye reduction and colour correction, and a handy crop tool that can use a variety of preset image proportions, such as those for standard 4 x 6 prints and 8 x 10 enlargements.

Editing an image never changes the original – rather, a new copy of the image is created with your changes applied. Going back to the original image is as simple as selecting "Original" from the Version drop-down box. You can store as many different versions of an image as you want.



Crop and colour-correct your images with a full revision history.

Another nice feature of F-Spot is the range of photo export options. Once you've sorted through your photos and found the good ones, you can export them as a HTML image gallery, directly into an installation of the web-based Gallery system (http://gallery.sf.net/), or in to a Flickr account (http://flickr.com/).

BATCH PROCESSING THE LINUX WAY

Editing images in apps like the Gimp is easy, but one thing that's typically not easy is editing a hundred images in the same way. The Gimp can do batch processing using its Script-Fu system, which lets you write scripts in a language called Scheme, performing just about any operation that you could do with the Gimp's GUI. Unfortunately, Scheme is a fairly odd programmang language, and it's certainly not friendly to newcomers.

The alternative is to use some good old-fashioned console tools, such as the ImageMagick (http://imagemagick.org/) and NetPBM (http://netpbm.sf.net/) packages, both of which you'll find packaged in virtually every Linux distribution. These tools both do similar jobs, but they work in different ways, and each handles different things better than the other, so it never hurts to have both around.

Performing a format conversion, or a simple operation like an image resize or unsharp mask across a batch of images is easy using ImageMagick's "mogrify" tool.

Be careful though – mogrify overwrites the original image after processing, so you might want to make a backup first. To resize a batch of images, try something like this:

```
mogrify -resize 800x600! *.jpg
```

Check the mogrify manpage (run "man mogrify") for a complete list of operations that you can perform.

ImageMagick has a monolithic design, where every tool knows how to handle image files in all sorts of different formats through a shared library. NetPBM, on the other hand, leverages the Unix philosophy to do things in a more modular manner. NetPBM breaks out image readers, image writers, and processing tools, in to seperate programs, all of which speak NetPBM's internal image format. By using shell pipes, the seperate tools can be joined together to perform all sorts of operations. A simple JPEG image resize, perhaps to make some thumbnails, might look like this:

```
jpegtopnm image.jpg | pnmscale -
width 160 -height 120 | pnmtojpeg
>image-small.jpg
```

This chain of commands converts the input file from JPEG to PNM, scales the PNM, and converts the result back to JPEG. By stringing commands together, you can produce some quite neat results. For instance, the following invocation converts the input image to greyscale, and then back to colour with a sepia tone:

```
jpegtopnm image.jpg | ppmtopgm |
pgmtoppm rgb:24/1c/00-
rgb:e9/e1/c0 | pnmtojpeg >image-
sepia.jpg
```

You can insert extra commands anywhere along the pipeline, so if you wanted to make your sepia output images smaller, you could add a pnmscale in there, or perpaps a pnmcut to do some cropping. Check the netpbm mainpage for a list of the commands available.

That takes care of processing single images, but how do you handle batch processing? A "for" loop in bash, the most common Linux shell, takes care of this. For loops are one of the most useful things you'll ever learn to do in bash, since you can batch-perform just about any operation using it. A very simple and handy example is a simple rename of a bunch of files based on a pattern, such as changing a ".htm" extention to ".html":

```
for file in *.htm; do mv $file
${file/.htm/.html}; done
```

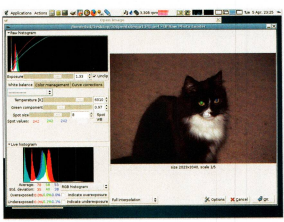
Look at the command for a minute, and it should start to make sense. In this case, the for loop is looping over the names of all the files in the current directory that match the "*.htm" pattern. For each of these filenames, the loop executes the "mv" command, giving it two arguments – the original filename, and the filename with the old extension replaced with ".html".

Processing multiple images is exactly the same, but with the "mv" command replaced with our NetPBM pipeline:

```
for file in *.jpg; do jpegtopnm
$file | pnmscale -width 160 -
height 120 | pnmtojpeg
>${file/.jpg/-small.jpg} ; done
```

THE RAW END OF THE DEAL

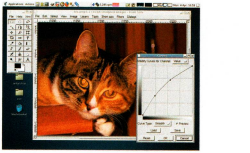
Modern shiny cameras, like the Pentax istDs digital-SLR I've been playing with lately, are finally starting to cast off the lossy shackles of the JPEG image format, offering support for the so-called RAW format. RAW is more than just a lossless format – it's literally the raw image data, straight from the camera's CCD, with none of the usual white balancing and other operations usually applied by the camera's image processing hardware. This makes using RAW more involved than JPEG, but with a bit of work you can get some very impressive results.



▲ Import RAW images in to the Gimp with UFRaw.

RAW format is more a general description than a formal spec, with many manufacturers having their own specific flavour, but a talented hacker named Dave Coffin has reverse-engineered just about all of the different formats and produced a tool called dcraw (www.cybercom.net/~dcoffin/dcraw/) to read them.

You can use it directly on the command-line to convert to more readable formats, but the easiest way to use it is to grab the UFRaw plugin for the Gimp (http://ufraw.sourceforge.net/).



▲ Cinepaint, which was developed for the movie industry, is perfect for handling RAW images.

The UFRaw plugin gives you an abundance of colour adjustment sliders, with a live preview, so you can get things just right before importing.

However, processing RAW files in the Gimp throws away a lot of information, since dcraw can extract 48-bits of colour information per pixel (16 each for red, green, and blue), rather than the 24-bits that the Gimp can deal with.

To edit the image with the full dynamic range of each pixel intact, you'll need to use Cinepaint (http://cinepaint.sf.net/), a special version of the Gimp developed for the film industry. It's available packaged in Debian and Ubuntu, and packages exist for most other distributions as well.

To import RAW files in to Cinepaint, you need to use dcraw to convert them to 16-bit PPM files, and then the "pnmtopng" tool from the NetPBM package to convert the PPM in to a 48-bit PNG file that Cinepaint can open. Make sure you've got a good bit of hard drive space around though – even when compressed, a 6 megapixel 48-bit PNG can easily come to 25MB or more.

```
dcraw -c -4 imgp1342.pef |
pnmtopng >imgp1342.png
```

Once you've opened the PNG file in Cinepaint, it will almost certainly need some colour balancing – you'll find that the Curves tool under Image/Colors is usually the easiest tool for the job. Cinepaint doesn't have as many tools as the Gimp, but it has the basics covered. When you want to export the image, select the "8-bit unsigned integer" option to convert the image back to 24-bit before saving. ■

LEIGH DYER

Leigh Dyer is a sysadmin and developer for health IT company, eClinic. You can contact him at ldyer@pcauthority.com.au.

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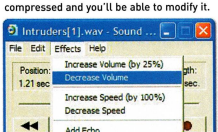
QUESTIONS & ANSWERS

David Moss equalises volume for different file types, locks down headers and footers, and reinstalls some Smart Tags.

TOO LOUD

Q I've created a PowerPoint presentation that makes a lot of use of sound files. These have come from a number of sources and are in multiple formats. When I run the slide show, they all play fine, but the volume at which they play varies. Some are incredibly loud and I can't get them to quieten down. The presentation won't work without the sound bites. I'm using Microsoft PowerPoint 2003.
G Etherton

▲ If you can see a green line in Sound Recorder, it indicates the sound file isn't compressed and you'll be able to modify it.



▲ Use the Decrease Volume setting to lower the volume in existing files in order to make them a more bearable when they play back.

A This is a known problem that affects more than PowerPoint (as anyone who's ever loaded children's software and found half the sound is too quiet and the other half ludicrously loud will agree). It arises because the Windows Media Control Interface has problems handling certain file types, but rather than list them all here are the sound file types it is happy with: AIF, AIFF, AIFC, AU, M3U, SND and WMA.

One suggestion, therefore, is to convert your troublesome files to one of these formats, such as WMA (it would probably be easiest to change them all to the same format). If the sound files causing the problems are uncompressed, you could adjust their volume settings using the Sound Recorder applet, by following these steps:

1. From Start, select All Programs | Accessories | Entertainment | Sound Recorder.
2. Load the desired sound file via the File menu.
3. If you see a green line, the file is uncompressed and can be worked on.
4. To reduce its volume, go to the Effects menu and select 'Decrease Volume'.

TOO COMPLETE

Q I have an infuriating problem with Outlook: it conveniently remembers my addresses and gives me a drop-down menu after typing three letters in the To... box, but I can find no way of removing unwanted entries. I've removed the contacts and deleted all relevant emails, but I suspect it's something to do with a file called outlook.nk2. I've tried modifying it, but just succeeded in losing all my remembered entries. Maybe the only way is to delete the file and start again?
P Riley

A To solve your immediate problem, type the recipient's name into the To: field and, when AutoComplete kicks in, move the highlight to each contact you want to delete using the Down Arrow key, then hit Delete.

The only time this won't work is if there's a single name in the cache; in that case, create a new entry sharing the same first three letters as the existing one, then delete the offending entry. Of course, this still leaves you with a single useless entry, but, hey, who said all solutions are perfect?

Outlook uses the same cache for both automatic name checking and auto-completion, and it can become corrupted, which is bad news as emails could possibly get sent to the wrong person. Even if that doesn't happen, Outlook may fail to identify recipients correctly, which is a royal pain. In such a case, you can delete the cache file and have Outlook create a new one, by following these steps:

1. With Outlook closed down, fire up Windows Explorer, select Tools | Folder Options and click on the View tab.
2. Go to Advanced Settings and look for 'Show hidden files and folders'. Clear the checkbox so that hidden files can be displayed and hit OK.
3. That done, head to Start and select Search. Choose the 'All files or folders' option and set it to search for '*.NK2'. (These used to be NICK files, which is why this item is referred to as the 'nickname cache'.)
4. Run the search on your local hard disk and, when the file is displayed, rename it with a BAK extension.
5. When you restart Outlook a new cache file will be created. ▶

DAVID'S TIPS 1: USB INTERRUPTUS

If you have a hot-pluggable USB device plugged into your system, do the decent thing and disconnect it using the system-supplied software. Don't just yank it out after you've finished using it, because you can easily end up with corrupt data or, as I observed the other day, with no data at all. The incident I witnessed was of one of those pocket-sized USB flash drives being tugged out of its slot after its owner had copied a folder with six files onto the device. I knew he'd done the copying because I saw it happen, but when he plugged the device into his laptop the folder and all its files were missing. I suspect that his data was still held in Windows memory cache and it hadn't got around to writing it to the drive.

If you tell the system to remove the drive for you, it will ensure that all data is written to the device before popping up a small dialog telling you it's now safe to remove from the system. You can activate this by left-clicking on the icon in the System Tray that appears whenever you plug a device in. The icon has a green arrow pointing diagonally down from right to left, sat atop a small grey hard drive. When you left-click, you'll see a small window appear that says something like 'Safely remove device...' Just click on that and a few seconds later you should get the message that it's now safe to remove the device from the system. By the way, it's also a bad idea to remove Bluetooth devices without disconnecting them properly too.

▲ Protecting Section 1 in this document will ensure that while the main body of the document can be worked on, the header and footer content can't be changed.

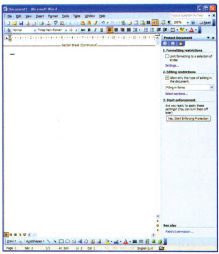
FIXING FOOTERS

Q I've created a number of Word 2003 files with data in the headers and footers that I don't want to be modified by anyone. Is there a way to somehow stop users from making changes to the content?
S Masters

A Indeed there is, by following the steps below:

1 With your Word document open, hit <Ctrl-Home> to ensure you're at the top of the document, then go to the Insert menu and select Break.
2 When the Break dialog appears, look under Section break types and select Continuous, then hit OK.

▼ Want to stop header and footer content from changing? Use the Protect Document feature in Word to get it done.



3 Now head to the Tools menu and pick 'Protect Document'.
4 The Protect Document task pane will appear on the right. Click the checkbox labelled 'Allow only this type of editing in this document' and then change the drop-down combo entry to 'Filling in forms'.
5 Click on the 'Select section' link and, when the Selection Protection dialog appears, clear the Section 2 checkbox, then click OK.
6 Go back to the Task pane and click on the button labelled 'Yes, Start Enforcing Protection'.

READERS' TIPS 1: PAY AS YOU GO

I received this email from Nigel Mercier, regarding the response I made to F Marsh in April, page 138.

'You answered a question from F Marsh who was having a problem picking up mail from MSN using Outlook Express. Isn't the problem here that MSN and Hotmail no longer allow users to use Outlook Express unless they pay?'

Thank you for writing in Nigel. Mr Marsh's problem was in fact caused by his security settings, but the point you make is a good one. I'd completely forgotten that Microsoft had changed its policy with regard to Outlook, Outlook Express and MSN Hotmail accounts, so I think I'd better make sure everyone knows about this.

One of the biggest problems Microsoft faced was spammers using free Hotmail accounts to send their rubbish, making use of the fact that Hotmail can be accessed via a technology called Distributed Authoring and Versioning, which enables you to access your email from Outlook or Outlook Express so you don't need to use a web browser.

Unfortunately, these scum that fill our inboxes with junk immediately exploited this technology to spread spam, forcing Microsoft to prevent people from using MSN Hotmail with Outlook or Outlook Express unless they paid for the privilege (using it via a browser is, of course, still free).

Currently, the problem only occurs if you try and set up Outlook Express or Outlook since the policy change. If you already had them configured to use MSN Hotmail, it should have carried on working, but I do know that Microsoft will be changing this situation one day too.

The error message you'll see if you try now varies slightly. If you haven't installed Windows XP Service Pack 2, you'll just get an 'Unknown Error', which doesn't tell you a great deal.

Following the Details link does, however, tell you that you need a subscription to access MSN Hotmail via Outlook or Outlook Express. If you do have SP 2 installed, the error message makes it clear where the problem lies:

'Could not connect to Hotmail as username@hotmail.com Hotmail no longer allows email access via Outlook Express for free Hotmail/MSN accounts.'

SP 2 'FEATURE' OF THE MONTH

Q Something weird has happened to my Outlook 2003. I used to get a small window pop-up when I hovered over a new sender's email name that let me add them to my Contacts. I now find that I can't see these pop-ups any more. Is this an SP 2 'feature'?
V Bailey

A It is indeed. The pop-ups you refer to are called Smart Tags and they're blocked from appearing in Outlook 2003 after you install Windows XP SP 2. There are a couple of cures, the simplest being to upgrade your Office 2003 installation to SP 1, which requires a quick visit to the Microsoft Office Downloads page at http://office.microsoft.com/en-au/default.aspx. Make sure you have your installation media to hand if you do.

For a quick fix, you need to modify the Registry, so be sure to make your backups and restore points and the other stuff you need to do every time you modify your Windows config, then follow these steps:

HOME | NEWS | REVIEWS | LABS | FEATURES | MAGAZINE

For more technical help and professional advice head to:
www.pcauthority.com.au

▲ A quick visit to Microsoft's Downloads section will help you upgrade your Office 2003 installation.

1. In the Start | Run edit box, type Regedit and hit Enter.
2. Find the key HKEY_CURRENT_USER\Software\Microsoft\Office\11.0\Outlook\Security
3. Select Edit | New | Key and name your new key RenderedIEBehaviours.
4. Head back to the Edit menu, select New | DWORD Value and name your new DWORD value #default#ieoouI
5. After hitting Enter to create #default#ieoouI, double-click on it and enter 1 into its Value Data edit box.
6. Click on OK, close the Registry Editor and you're done.

Smart Tags should now be operational again, but I recommend you upgrade to Microsoft Office 2003 SP 1 at the earliest opportunity.

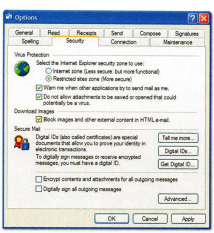
SHOW AND TELL

Q I have Outlook Express set to not show images in newly arrived messages, and it has been set like this since we installed Windows XP Service Pack 2. This works fine, and I can just click on the link to show images if I judge them to be suitable for viewing. The problem is that I forwarded a potentially suspect email to a colleague and he received it with all the images displayed. We've tested this a couple of times now and it's still the same. How can we fix it? **Y Vale**

A There isn't a lot that you can do about this. When you initially receive the email, Outlook Express looks at your settings, sees that they're set to 'Block images and other external content in HTML email' and does its job by stopping the images appearing in the email viewer, replacing them with a set of boxes with little red crosses in the corner.

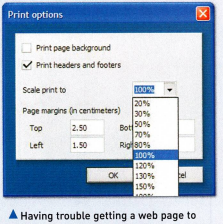
The problem arises when you forward (or, indeed, reply to) an email, because when you send this message Outlook Express automatically attempts to download the external content. While it blocks content on receipt, it will always pick it up again should you send the mail to someone else.

Possible solutions are not to include the original message content in your reply, or else to make sure that whoever you send the message to is also set up to block external content, as their own mail client should then provide them with protection. ■



▲ Outlook Express set to block external images and content, but that's only on the way in. It will download the content if you forward the message (or reply) and include the content in the reply.

READERS' TIPS 2: TICKETS TO THE OPERA



▲ Having trouble getting a web page to print properly? The Opera web browser's Print Scale option might be just the ticket.

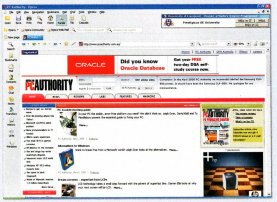
The second Reader's Tip this month also stems from an answer I made in the April issue, where I addressed a problem faced by H Davis over printing web pages that were getting chopped off on the right-hand side when sent to his printer. I talked about a lot of potential solutions in my reply and I won't repeat them all here. I will, however, hand you over to Simon Conway-Smith, who sent me the following solutions:

1. Use the Opera browser, where you can specify a scaling factor in the print setup. I've set mine to 90 percent, which brings all pages neatly within the page borders. With modern printer resolutions, reducing the print size slightly has no adverse effect on readability. Also, who says you have to use IE all the time?

2. Do a similar thing in the Printer driver setup, but only if the printer driver supports it.'

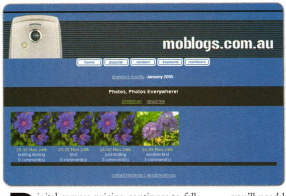
This is a really good tip. After reading Simon's email, I downloaded the latest version of Opera. To find the Print Scale feature, head to File | Print Options and select one of the preset offerings, or else type your own value in the box. I also noticed that Opera has another neat feature (actually, it has a lot of nice features, but this one stood out instantly): just above the page you're viewing is the URL edit box, a search box and, next to that, a box that lets you resize the page you're viewing on-the-fly. This is handy when you hit a website that's wider than your browser window and you don't want to change the window.

▼ Our website is resized down to 90 percent. Graphics suffer but text is clear.



MOBILISE YOUR BLOG

Dan Chiappini shows you how to make updating your weblog from your mobile easy.



◀ Browse other users' galleries and see what other people are snapping.

Digital camera pricing continues to fall, as is obviously apparent in our Labs roundup this month. The fact that budding photographers can now pick up high resolution digital cameras is great, but not everyone wants to lug around a digital SLR and the associated accessories.

Mobile phone cameras have moved out of the CIF (Common Intermedia Format) 352 x 288 pixel realms, progressing through VGA 640 x 480 and there are now products available with 1 megapixel and above resolutions – with 5 megapixels winging their way to our shores by the end of the year.

Given the roaring trade in weblogs and the new wave of mobile handsets, it was really only a period of time until the two were introduced to each other. Mobility is key, and with that mobility comes the option to browse the web from your handheld. i-Mode technology brings services such as placing bids on your eBay auctions, playing games and reading your email to your phone. However, i-mode requires a different handset to operate on the network, so you'll need to ditch your current one to play.

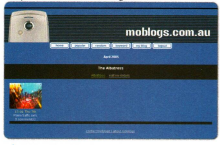
Until now, mobile handsets have generally only been used for viewing content, rather than participating. Websites such as Moblogs (www.moblogs.com.au) are turning the tables on this and allow you to update a visual weblog without needing to even touch your computer.

Registration is free, and once you've filled out the online form with your preferred user name, four digit security password (which you'll need later) and contact details, you'll receive an email asking for confirmation. Moblogs allows you to upload content from both your handset and home PC using a web interface. If you wish to add video files (supported in embedded MOV format on the page) or stills, all you need do is upload them using the email or MMS function on your phone and send them to YOURLOGINxxxx@moblogs.com.au.

The xxxx is replaced by the four digit pin you selected when registering. The security system ensures only those with the selected pin can make changes to the album. Since the service isn't locked to one mobile number, it makes it a perfect photo library for a group of friends or family.

You can add image captions to your files, and the site then allows you to include detailed descriptions and receive feedback about your images from other users. The service even auto creates a thumbnail of your image in the gallery, making it easy to browse your files; simply click the thumbnail for the full-size view.

Be aware, while the web service is free, you'll be required to pay your carrier's multimedia message costs. Most carriers will let you use your 'free calls' over SMS, MMS and telephone calls, so it may cost you nothing.



▲ Point and shoot has been taken to a new level. Upload your images to the gallery and browse your files with ease.

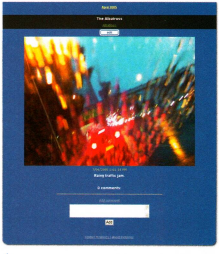
SNAP HAPPY

There's no real trick to taking a good photo with a mobile phone, but we have a couple of handy hints that will help get the most from your snaps.

❶ Where possible, shoot using direct sunlight. Even the better quality camera phones often have trouble shooting in low lighting conditions as there's usually no selectable ISO rating. Experience tells us that direct sunlight images are usually the sharpest, so consider coming back later when the light is better for immovable objects such as landscapes, monuments or amusing street signs.

❷ If you find you have the shot of a lifetime and simply must shoot at night, where possible enable the camera's low light compensation feature. These are often called 'night mode' or something similar and often produce additional image noise by pumping up the contrast levels, sometimes to the point of destroying the image.

❸ Mobile phone cameras are incredibly susceptible to shaking from twitchy hands. Depending on your type of handset, you may find the best results come from bracing your arms on a surface such as table or wall. If your camera has a self timer, frame your shot, place it on a solid surface and wait. ■



▲ Click to see full-sized images in all their glory. There's even room to add comments.

▲ The site even ranks users by popularity, showing those who get the most hits.

MESSAGE IN A BATTLE

Dan Chiappini takes the perplexing out of texting and shows you some alternative ways to send messages.

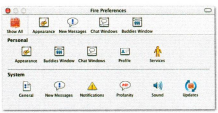
While instant messaging, or IM, hasn't had as much impact as email, it has still had a dramatic impact on how we communicate, particularly in casual situations. Transcending the barriers of geographical inconvenience, messaging has moved out of the world of bedroom geekdom and is now a legitimate method of contacting friends and family overseas or deploying a workforce to do a job.

IM like many internet technologies took off slowly, but was helped along by Mirabilis, developer of ICQ, one of the best known and earliest services available. Now with over 150 million registered users worldwide, the software has gone through many revisions, each instance providing new features such as sending SMS to a mobile phone from your PC.

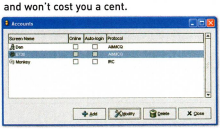
While ICQ is still going strong, its once barely contested market share is being attacked by Yahoo!, AOL and MSN.

MSN has grown tremendously in popularity, largely because of the connection to Windows, Passport and Hotmail, allowing for easy sign up.

As happens so frequently with software, some users don't much fancy the look or feel of the way the default IM clients work. As a result of this there is a plethora of alternative clients available, many of which are capable of spanning the numerous programs and networks and condensing them into a single user interface.



Minimalist in every sense, it's easy to use and won't cost you a cent.



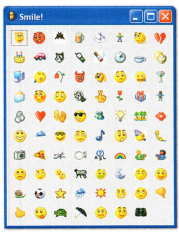
Handle multiple accounts easily with Gaim's easy user interface.

GAIM

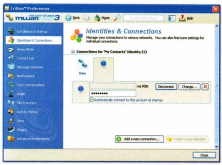
Gaim uses a similar visual style to Microsoft's official MSN client but goes much further. Monitor your contact list quickly with each user's avatar displayed in the list of names. This system helps with those users who frequently change their display name and goes a long way towards eliminating the need to remember email addresses as long as an image is associated with their account. The emoticon section has also been expanded to include some of the more obscure icons without needing to use the additional web-based look up index. One of the best featured options around, Gaim will interface with MSN, AIM, ICQ, Yahoo!, IRC, Jabba, Gadu-Gadu, SILC, Groupwise Messenger and Zephyr networks. Best of all, the client will run under BSD, Linux, Mac OS X and Windows, so nobody misses out.

MIRANDA

Another free replacement for multiple stand alone messengers, Miranda (www.miranda-im.org/) has been designed to not only take the pain out of multiple applications, but it reduces the memory footprint and requires no installation. Designed for the Windows platform, it'll work with Windows 95, 98, ME, NT4, 2000 and XP and is perfect for users with older systems with limited system memory. Constantly being developed, check back at the Miranda website often for evolving bug fixes and new features.



Say what you mean with pictures using Gaim's extended list of MSN emoticons.



A comprehensive range of options and account management options make Trillian a powerful chat tool for home or business.

Only as big as you want to make it, it'll slash your memory costs as well.

TRILLIAN

Heralding itself as 'The Swiss army knife of instant messaging' Trillian really can do it all. Combining four of the most popular messenger programs, it supports IRC, AIM, ICQ and MSN. If your chatting partner has the same client there is a huge range of emoticons to use and there's even a mouse-over that connects to the Wikipedia for definitions on the fly – particularly handy for when someone throws a curly one at you. The basic version is available to download free at www.ceruleanstudios.com with an option to pay US$25 for the Pro version, which gives you added video chat options, mail notification and other features.

FIRE

Instant messaging isn't just for the PC guys, Apple users are in on it too. Fire (http://fire.sourceforge.net/) is a Mac OS X client licensed under the GNU General Public License and capable of working with MSN, AIM (AOL's instant messenger) ICQ, Yahoo!, IRC and Jabba at once. In typical Apple style, Fire has a clean and uncluttered interface, and since it's an open source project; it comes to users free of charge. ■

JARGON BUSTER: CD/DVD BURNING

Dan Chiappini delves into burning jargon and explains it all in our monthly tech term glossary.

CAV (CONSTANT ANGULAR VELOCITY)

Optical drives using CAV methods for reading and writing technology spin media at a fixed rate of speed, measured by the number of revolutions turned per minute. A common type of technology in drives, a problem with this method of reading is that although the disk turns at a uniform rate of speed, data stored closer to the middle of the media will be read more slowly, while data at the edges will be read quicker.

CLV (CONSTANT LINEAR VELOCITY)

The CLV school of thought changes the speed of rotation as the drive head moves outwards from the center. It does this to maintain a constant read and write speed. Drives often use CLV when burning media as the consistency of speed helps reduce the likelyhood of burning disks with errors. Drives often employ a combination of CAV and CLV for playback.

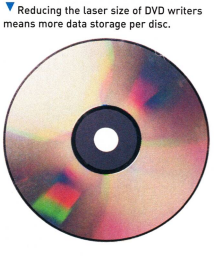
P-CAV (PARTIAL CONSTANT ANGULAR VELOCITY)

Developed by Yamaha, the P-CAV writing method tries to keep a constant rate of revolution while the middle of the disk is written. When a set point moving away from the middle of the media is reached, the disk rotation speed slows to reduce the risk of vibration and writing errors.

BLU-RAY

Blu-ray is a DVD technology that uses a blue or violet laser rather than the traditional red laser found in current generation optical drives. The move to a thinner 405nm blue laser from the fatter 650nm red laser allows it focus on smaller areas on the disc. This means data can be packed more densely, and thus allows for greater storage capacity. Blu-ray takes DVD storage from 4.37GB to nearly 30GB, making it capable of holding over two hours of high definition video and audio.

▼ Reducing the laser size of DVD writers means more data storage per disc.



DUAL LAYER

Still a fairly recent addition to the DVD writing family, dual layer burners make it possible to burn up to 8.5GB of data onto a single disk. The system works by having two separate writable layers. The laser writes from the centre of the first layer and once it gets to the outside it refocuses to penetrate the second layer of substrate and work its way back towards the centre. Originally only available for the DVD+R format, the DVD Forum, developers of the DVD-R/RW standards are yet to release a retail DVD-R dual layer writer for consumer use. Once available, as was the case with DVD+9 (DVD+R dual layer disks), media will most likely be scarce and expensive to purchase.

DVD-R/-RW

The first DVD format to be commercially available to users, it has been the DVD Forum's format of choice, pushed for its claimed playback compatibility with home set top players. Unlike DVD+RW however, re-writable DVD-RW discs need to be completely formatted, rather than a short add or subtract burn as with DVD+RW.

DVD+R/+RW

The plus format was created by the DVD Forum's competition, the DVD Alliance. The Alliance is backed by companies such as Philips, Sony, HP, Dell, Ricoh, Yamaha and Verbatim and was the first to market with a dual layer writable DVD at 2-speed, with 4-speed soon to be available. ■

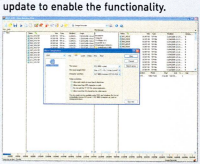
▲ There's a range of burners to suit whichever format you choose.

CHOOSING BURNING SOFTWARE

You have your hardware installed and a spindle of your media of choice, now it's just a case of choosing which application you want to burn your files to CD with. There is a range of popular burning software available, spanning from the freeware alternatives found on Tucows (www.tucows.com) to the paid for popular bundled ones such as Nero, Easy CD Creator and Sonic Burner.

Most new drives will come with a free copy of one of the above and will allow you to create data discs, audio CDs and home movies as well as back up photos and files.

Select the application which best suits your burning needs. The major differences between the available options are user friendliness and supported file formats. If you have a newer dual-layer DVD burner, ensure your software of choice has support to write to both layers out of the box. Otherwise you may require a software update to enable the functionality.



▲ Nero is one of the most popular apps.

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GAMES

Dan Chiappini and the ***PC Authority*** team cop another serve in Hell, relive World War II and kick down some doors in SWAT 4.

BYTES

WWII, TWO.

Just when you thought the war was over, Infinity Ward has dredged up World War II again and is putting a new spin on it. Call of Duty 2 will boast a new proprietary game engine, striking new visuals, advanced AI and team-based combat. The game is slated for release later this year.

DOOM 3

Evil is apparently very hard to kill, at times jumping from platform to platform. Doom 3 is now available for the Xbox game system and sees players battling hell once again. New additions to the console version include a two-player co-operative mode and the ability to battle others online with support of Microsoft's Xbox Live multiplayer service.

HALF LIFE 2 TO EXPAND

Rumours are beginning to circulate of a yet to be announced expansion pack for Half Life 2 tentatively dubbed 'Aftermath'. The storyline is rumoured to be a logical continuation of the end of Half Life 2 and will offer some twists to what you already thought you knew about the main characters and their alliances. There's even talk of playing as characters other than everyone's favourite nimble theoretical physicist Gordon Freeman.

PSP TOPS 500,000 UNITS SOLD

Sony Computer Entertainment America has announced the PSP (Playstation Portable) handheld has sold more than half a million units in its first two days on sale and raked in US$150 million (approx. AU$194 million) worth of revenue in its first week. Currently there's no firm Australian release date for the product, but the unit will no doubt enjoy success on our shores as it has internationally.

WOW PLAY TIME EXTENDED

March 22 saw the release of another of Blizzard's major content patches for the critically acclaimed World of Warcraft game. While the patch made several changes to gameplay, re-jigged some character classes and added new challenges and areas, it also introduced several new bugs. These new bugs included one that would cause users' systems to crash when attempting to use a teleport and another that caused problems with the user interface in some areas of the game. As a result, Blizzard credited all users with a two day time extension on their accounts and a rest bonus state providing 200 percent experience. This isn't the first time scheduled maintenance and server-side problems have caused game closure, but it is encouraging to see players being compensated for time lost, especially given the game is based on a paid-for subscription model.

SIMS 2: NIGHTLIFE

Those crazy guys at Maxis are at it again, developing another expansion for the hugely popular Sims series of games. Having already sold more than 4.5 million units worldwide across the series to date, Sims 2 builds on the already popular Sims series which sees users controlling the lives and actions of animated characters in realistic situations.

Maxis is no stranger to expansions, releasing seven packs for the original game including: Livin' Large, House Party and others. Sims 2: Nightlife will be the second expansion for the sequel series, following the University expansion launched in March this year.

Nightlife will put players in the control seat of their virtual characters, with Electronic Arts promising 'all new dating gameplay'. To aid this, there's a range of new environments and items including nightclubs, DJ booths and poker tables.

The game is scheduled to ship in Spring this year in the States. In the meantime we'll wait with baited breath.

CITY OF HEROES

FOR
Involving world, great atmosphere, and varied hero customisations.

AGAINST
Some generic environments; lacking in role-playing elements.

OVERALL ★★★★★☆

Trust me, it's a nefarious plot, worthy of Lex Luthor or Doctor Doom. Australia's best minds will be stolen by a game so thrilling and addictive they'll be unable to tear their hands from the keyboards or their eyes away from the screen. Sleep, social lives, relationships, even jobs, could be lost, and what's more the fools will pay about $27.50 per month for the privilege. And, while they're doing so, the Martians, the Molemen or the trans-dimensional beings of Galaxy X are be free to conquer Earth.

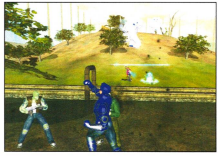
The world is Paragon City, in which costumed heroes patrol the skies or walk the streets, ever ready to face the dark forces that want to dominate or destroy their gleaming metropolis. Street crime is a persistent menace, but in a city where aliens, mutants or giant snow-monsters could be around the next corner, gang violence is the least of your worries. Luckily, while the normal citizens live in fear, you don't have to. As a costumed hero, you have the power to battle evil and ensure that truth and justice prevail.

Even better, the style of hero you play is entirely up to you. Players can choose from five basic types, with varying defensive and offensive capabilities, and from five origins – magic, mutant, science, technology and natural. These affect the sort of powers they can harness. After that, you still have a wide selection of powers to choose from, and then a genuinely vast wardrobe of costumes, hairstyles, physiques and forms to clothe your hero in. If you can imagine a hero, you can produce it, and if the huge variety of heroes you'll find in Paragon City proves anything it's that some people have a pretty wild imagination.

▲ Huge hero monuments help to flesh out the atmosphere in City of Heroes.

Once your hero is finished, there's a quick and painless tutorial level, then it's time to put him or her on the streets of Paragon City. For an easy start, the game uses a system of contacts to give you missions and send you in the direction of the nearest brawl. These missions usually come down to finding an area and clearing it of hostiles, but it's a good way to get you into the game and build your powers without the 12 hours of rat bashing that some massively multiplayer games deem a sensible initiation. If you don't feel sociable, you can follow this approach for a long, long time, fighting bigger foes and exploring a wider range of powers, but this entirely misses the point. City of Heroes only shows its true brilliance once you start getting involved with the wider community.

Join up with a team of heroes – don't worry, they're usually friendly and will probably invite you if you show a bit of willing – and the game opens up a lot more. The hordes of mutants that make certain districts no-go areas for lone crime fighters are easy meat for a balanced group, and NCsoft has added some neat features to make it easier for players at different levels to play together. As you develop your hero, there are bigger and brawnier opponents to destroy and, with energy beams flying in every direction while furious brawlers and flame-wrapped heavy-hitters take the fight straight to the enemy, a mass super-powered scrap becomes a wonder to behold.



▼ The combat-heavy gameplay and multiple hero customisations allows for fun and varied action throughout.

These are the moments where the game is at its best visually. While Paragon City has some dramatic architecture, there's no denying that some districts and many of the internal areas have a touch of the generic about them. A sizable population and some busy traffic keep the streets from looking empty, but once you get away from the central plazas with their huge hero monuments it's little more than a blank canvas, waiting for some broad strokes of superhero colour.

City of Heroes is undeniably a fight-fest, not a thinking man's RPG, but at least NCsoft is committed to adding content: expect new villains, plotlines, powers and areas to the game as time progresses. More importantly, the city is full of regular people just having a blast. It might be the quantity of crazy costumes, or the sheer silliness of the whole endeavour, but this is one game where people are out for fun, not just the next level or a new magic broadsword +10.

REQUIREMENTS
1.7GHz Pentium 4/AMD equivalent; 512MB RAM; 64MB graphics card; 2GB hard disk space; broadband internet connection; Windows 98 onwards.

SUPPLIER GamesWarehouse

PRICE $69.95, then $54.95 for 60-day time card

www.gameswarehouse.com.au

SWAT 4

FOR
Top first person shooter strategy; great interface; excellent atmosphere.

AGAINST
Lack of attachment to team members; no main plot; too slow-paced for some.

OVERALL ★★★★★☆

The last remaining survivor of the once venerable Police Quest series, Daryl F. Gates' SWAT marked a new direction for Sierra, combining the logical thinking of the adventure series with the fast-paced action of a shooter. What this spelt was a new franchise that was to see the publisher into the new millennium.

It's because of this that we're lucky enough to have the fourth installment of SWAT in 2005, the series now firmly entrenched in its genre, next to Ubisoft's Rainbow Six. The new installment at its core a tweaked-up version of SWAT 3, done with a new engine and a variety of fresh bits to perfect an already strong formula.

In SWAT 4, the player's in control of two teams of officers and a sniper. Using these resources, you must tackle a series of unrelated situations from rescuing hostages to securing illegal weapons.

As a result, the emphasis is placed on careful investigation of each environment and the wise selection of appropriate weapons and tools. And there are plenty to choose from. Although many players will be happy that there's a solid choice of primary weapons from silenced MP5s to 12-guage shotguns, these fade into the background when you realise shooting is a small part of the main game. Most of the time, your team will be taking it slow – throwing flash grenades, using lock picks and checking under doors.

Once in-game you can easily control each team using a 'window-in-a-window' interface, which lets you give commands to team mates when they're out of your line of sight, facilitating coordinated breaches. An easy-to-use and intuitive ordering system makes directing your team painless.

▲ Squad members play a vital role in breaching doors and clearing rooms.

In addition to clearing rooms and making arrests, SWAT 4 will present you with situations that require a little lateral thinking. For instance, in one of the earlier missions an old woman refuses to cooperate, and the only way to get her to comply with your requests is to use the taser or pepper-spray.

When you're all done with the single player, SWAT 4 also comes with a basic but well-featured quick mission creator and co-op/versus multiplayer over LAN and the internet.

If SWAT 4 has a weakness, it is in the lack of a main story to help spur the player on, and almost no attachment to your team mates. At times, it makes the experience somewhat clinical. All in all though, SWAT 4 is a welcome addition to the SWAT series. Daryl would be proud.

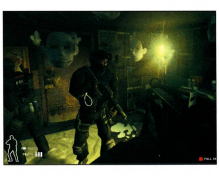
REQUIREMENTS
2.4GHz CPU; 512MB RAM; 128MB DirectX 9.0 video card.

SUPPLIER Vivendi Universal Games

PRICE $89.95

www.swat4.com

▼ SWAT 4 features many varied environments, situations and weapons – but don't expect an involving plot to tie the missions together.



BROTHERS IN ARMS: ROAD TO HILL 30

FOR
Graphics, audio and modelling; intuitive control system.

AGAINST
Limited and short; re-spawning squad mates detract from immersion.

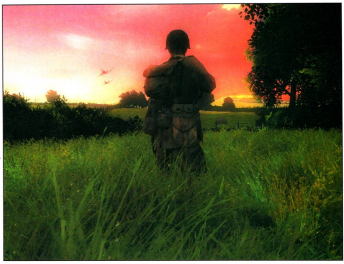
OVERALL ★★★★★☆

The PC console port of Brothers in Arms: Road to Hill 30 (BIA:RTH30) is yet another in a seemingly endless line of World War II-based first-person shooters (no bad thing, I love the genre) but at least BIA takes the tiring concept further by making squad tactics an integral part of the game play. While not the first squad-based shooter, Brothers in Arms does it properly unlike other games that have failed.

You're able to control up to two squads at any time, usually one a firing group equipped with rifles that is used to suppress the enemy by keeping up a volley of bullets, and the second an attack group armed with machine guns and grenades for flanking and eliminating the suppressed soldiers. You can also order your squads to risk everything, and assault directly. Tags over enemy posts and soldiers show the level of suppression each is experiencing, as well as giving an indication of when you can expect them to return fire, or burst forth. The control is simple. While you have your usual WASD configuration for movement, you use the left shift key for toggling and recalling squads. Holding down the right mouse button gives you a movable ground-based target which conforms to the terrain as you mouse-look, and lets you select when the squad should move to next. It's simple and intuitive, and it helps you against some cunning enemy AI. A handy, but not very expansive, situational view gives you the chance to pause the game and check your unit's health and positions before recommencing combat.

The gameplay is excellent, the graphics and audio gorgeous. Told in flashback, the first thirty seconds of the game immerses you in the brutality of the war in an in-your-face fashion. Heed the game's classification though, as there's a fair bit of swearing involved. Further immersion comes from the fact that the game (set in Normandy with the famous pre-D-Day paratrooper drops) is based on the true story of Sgt. Matt Baker a member of the 101st Airborne Paratroopers.

The single player campaign spans eight days, and many missions, although again we were disappointed at the shortness of the game. There are plenty of extras to unlock though, and the squad-based multiplayer combat is astounding. You have your own squad, plus they are paired with another player commanding a second squad. You are then pitted against a further two players controlling another two squads. It makes it a much richer experience than being paired off against the enemy AI.



▲ No time to enjoy the stunning sunset, Jerry's ahead.

Brothers in Arms is one of the finest examples of FPS and squad games in one. The graphics and audio alone are by far better than the recent Medal of Honor: Pacific Assault and the NPC mapping, storyline and action are far superior.

REQUIREMENTS
1GHz CPU; 512MB RAM; 32MB graphics card; 5GB HDD

SUPPLIER Ubisoft

PRICE $89.95

www.ubi.com

▼ Strategically ordering your fire teams is the key to completing many missions.

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EMPIRE EARTH 2

FOR
15 epochs to traverse; large variety of units and buildings; territory control.

AGAINST
Clunky interface; simplified tech tree; shares little that was good with EE.

OVERALL ★★★☆☆☆

While itself not a ripsnorter of a game, the original Empire Earth developed by Rick Goodman's Stainless Steel Studios had plenty of redeeming qualities to make it very playable and often enjoyable. The sequel however, developed by the Mad Doc Software, falls short of even this mark.

Empire Earth's standout feature was its epic scale – the player was tasked with progressing from one 'epoch' to another, each new epoch imparting better units, weapons and technologies. The way in which you progressed admittedly didn't make much sense (players had to stock massive amounts of resources), but the mechanic itself was solid.

In Empire Earth 2, gone are the innovations introduced in the first game – allowing the player to upgrade specific unit traits via the unit itself; the exciting feel of progressing from one epoch to another and general playability. If anything, EE2 takes a step backwards in many areas.

Territorial control is the crux of the game. In order to secure more resources and power, you have to seize marked-out areas of the map. This adds more direction to the game, and also gives you an indicator of how well you're doing.

Unfortunately the user interface is amazingly average. Unit control is a burden when it shouldn't be. Combat kind of just 'happens'. Health bars are often obfuscated by other units or special effects and formations make no noticeable difference. Additionally, the tech tree is inflexible and many of the bonuses it imparts are hardly worthy of the time taken to research them.

On the bright side, research is handled more sensibly in EE2 than it was in EE. The player can generate research points be garrisoning workers in University structures. The more units garrisoned, the faster points are generated. It's in the spending of these points the system falls down.

The experience is much like playing a game from a decade ago, and it's mostly thanks to the clunky and unappealing interface. The single player is a rehash of history-based titles that have come before it and is in no way compelling. For each range of epochs, of which there are three, the player must guide a particular race through those epochs. Of all the things to be preserved from the first game, this is the least welcome.

Many of the game's other problems are systematic of its slow pace and clumsy control system. Admittedly, the aggressive AI makes for a good challenge in the age of care-bear strategy, but it will frustrate the casual gamer. Overall, it's a disappointing sequel to one of the best in the genre.

REQUIREMENTS
2.2GHz CPU; 512MB RAM; 256MB DirectX 9.0 video card.

SUPPLIER Vivendi Universal Games

PRICE $89.95

WEB www.maddocsoftware.com

▼ Large variety of units and time periods, let down by a poor interface and a lack of innovation compared to recent RTS titles.

STRONGHOLD 2

FOR
Castles, traps, torture, gong – everything needed to build a castle.

AGAINST
Grinding combat, clunky interface, poor AI.

OVERALL ★★★★☆☆

There are few boys, and likely some girls, too, that aren't attracted to the idea of building a castle. Developers Firefly came to this very same conclusion with the original Stronghold which, although not a perfect game, was the closest we came to reliving our sandpit glory days. Firefly did a fantastic job of figuring out what made castles so fascinating, and delivered a comprehensive package on all fronts: castle building, sieges and medieval city management.

The sequel adds to this package in every way, and it's all wrapped up in a 3D paint job. The 3D engine isn't just eye-candy, however. Castle building is a more organic process, where your walls will now hug the rolling terrain as it winds around your territory. You can also zoom around your walls, showing every possible angle to view your master work.

Additionally, the strategic model that we were so fond of in the original is bigger and better. Managing your castle is a complex affair and keeping your people happy and productive is a balancing act of the many resources now available. The map is also divided up into estates, where you can control lesser towns and villages and funnel resources from these outlying territories.

Unfortunately, there are shortcomings that prevent this from getting the credit it deserves. The AI is atrocious in parts, meaning you'll want to play against your friends after you've bested the single-player campaigns.

The absence of roll-over mouse help is also a big oversight for a game that features an incredible amount of complexity.

But, these issues aside, this is still the best castle-builder out there, with one of the most impressive city management models around.

REQUIREMENTS
2GHz CPU; 512MB RAM; 64MB graphics card; 2.5GB HDD

SUPPLIER Take Two Interactive

PRICE $69.95
www.fireflyworlds.com

DOOM 3: RESURRECTION OF EVIL

FOR
Retains Doom 3's graphics, sound, and atmosphere.

AGAINST
Weak plot, gameplay can become repetitive.

OVERALL ★★★★☆☆

In a year that also spawned Half-Life 2 and World of Warcraft, it's easy to forget that Doom 3 was many people's favourite game for a few short weeks of last year. id Software is hoping to recreate that magic once more with the first Doom 3 expansion: Resurrection of Evil.

A familiar plot – meddling with forces beyond our control – and some new weapons greet you as you once again enter the Mars UAC facility. This time the action centers around the Artifact you find deep in the archaeological dig site – could it be a gateway to Hell? The Artifact also enables some familiar abilities unlocked by killing each boss – bullet time, (or 'Hell time' in this instance), berserk, and invulnerability.

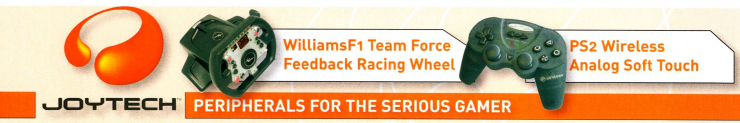
Just as Doom 2 added a double barrelled shotgun, so does this update – and it's the most effective as many enemies only require one shot. But most controversial is the inclusion of a gravity gun, or the 'grabber'. It's not as effective as the Half-Life 2 version, but is fairly intrinsic to the plot – you can pluck fireballs and plasma out of the air, and some puzzles require the use of the weapon.

Gameplay is similar to the first: creep around in the dark, get spooked by zombies in rooms full of servers, and wander lost in labyrinthine maps looking for power cells and pass cards. More fast-paced than its predecessor, Doom 3: ROE is a derivative, sometimes tedious, but ultimately entertaining romp through the caverns of Mars.

REQUIREMENTS
Doom 3 full version; 1.5GHz CPU; 384MB RAM; DirectX 9.0c 64MB graphics card; 1GB HDD space.

SUPPLIER Activision

PRICE $49.95
www.activision.com



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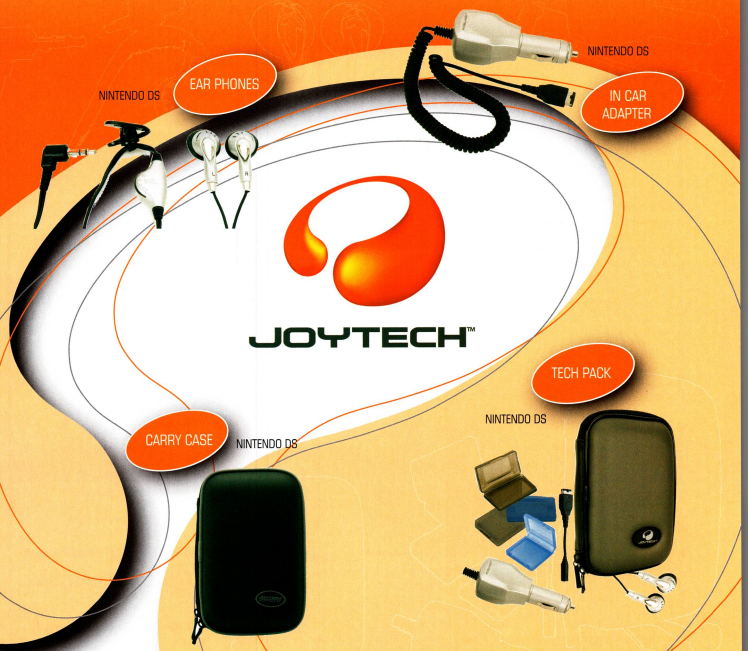

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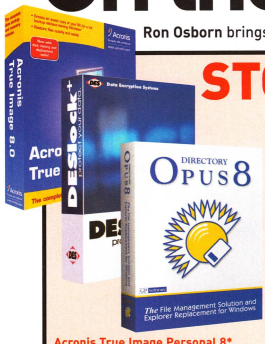
3 FULL VERSIONS

Ron Osborn brings you a complete guide to what's on this month's CDs.



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Acronis True Image Personal 8*

A major hard drive failure is the only time many people think about backups. Even if you've backed up a select few folders, you'll still spend ages reinstalling everything before you can restore the backups. True Image Personal offers a better option. It'll create an exact image of your hard drive, or a specific partition, so nothing will be left out.

To register for your free serial number visit www.acronis.com/mag/pcauthority-trueimage

Directory Opus 6.2*

Directory Opus is a powerful Explorer replacement, but it's carefully designed to feature the gentlest of learning curves. When you first run the program, in fact, it looks and works just like Explorer but even at this simple level you'll see benefits. You very rarely have to wait with Directory Opus; multithreading means you carry on with one task while another runs in the background. There are also abort buttons to cancel lengthy operations and more file viewers. With one-click access to common system folders and a "Recent Locations" list of the folders you've just accessed, you'll also cut the time you spend scrolling around. Plus, with the dual display feature you can split the File window into two. It's ideal for comparing the contents of two folders, and it makes complicated drag and drop operations easier too.

To register for your free copy of Directory Opus 6.2 ensure you are connected to the internet and follow the prompts when you first run the program.

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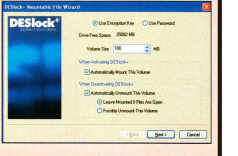
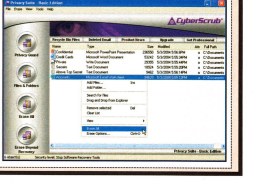


CyberScrub Privacy Suite 4 Basic Edition

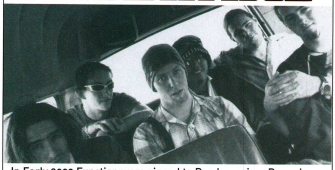
CyberScrub Privacy Suite ensures unwanted files really do disappear from your computer. Even the file name and other attributes are scrambled, meaning snoopers won't be able to extract any information from whatever remnants they might recover. And that means you won't be able to restore any files you select by accident, so be very careful when you use the program.

Limitations

Please note that this is the Basic Edition only, and many of the features aren't fully functional. You can see what Privacy Guard Professional can do, but won't be able to use those features.



Ozmusicweed

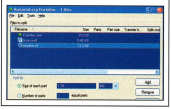


In Early 2003 Function were signed to Pandamonium Records and recorded their debut album, "Test Pilot". Along with traditional rock instruments like guitar, bass and drums, Function employed the use of more exotic instruments including Theremin, Tibetan Singing Bowl, Djembe and even an electric drill in the recording of Test Pilot. The band have garnered such reviews as "An intelligent blend of atmospheric rock", and "an innovative breath of fresh air and musicality".

FREEWARE

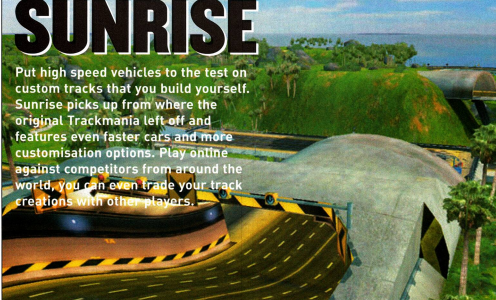
Create photo albums for the web, make your PC look like a Mac or just check the weather with this month's selection of freeware.

Cobian Backup
Darilius
ForecastFox
Media Catalog Studio Lite
ObjectDock
Omea Reader
WinHTTrack
YoPoW



TRACKMANIA: SUNRISE

Put high speed vehicles to the test on custom tracks that you build yourself. Sunrise picks up from where the original Trackmania left off and features even faster cars and more customisation options. Play online against competitors from around the world, you can even trade your track creations with other players.



DISC 1

Full Versions
- Acronis True Image Personal 8
- DESlock+ 3
- Directory Opus 6.2
- CyberScrub Privacy Suite 4 Basic Edition

Freeware
- Cobian Backup
- Darilius
- ForecastFox
- Media Catalog Studio Lite
- ObjectDock
- Omea Reader
- WinHTTrack
- YoPoW

Multimedia
- Audacity 1.2.3
- DivX Codec 5.2.1 (Windows 2000/XP)
- DivX Codec 5.2.1 (Windows 98/ME)
- FreeRip 2.941
- IrfanView 32 3.95
- Musicmatch Jukebox 10 Basic
- ThumbsPlus Pro 7
- Winamp 5.08
- Windows Media Player 10 (XP)
- Windows Media Player 9 (98/ME/2000)

Windows
- 3DMark05 Free Edition
- Access Manager 2 Free Edition
- Ad-aware SE Personal 1.05
- Adobe Reader 7.0
- AVG 7.0 Free Edition
- Desktop Sidebar
- EditPad Lite 5.4.3
- engin Xpro
- ExplorerXP
- Google Desktop Search
- NOD32 Antivirus System 2
- Spybot Search & Destroy 1.3
- StyleXP 3.0
- True Launch Bar
- Tweak UI
- WinRAR 3.42
- WinZip 9.0

DISC 2

Internet Essentials
- AOL Instant Messenger 5.9
- Crazy Browser 1.05
- CWShredder
- FileZilla
- Google Toolbar 2.0
- ICQ 5
- K9
- LeechGet 2004
- Miranda IM
- Mozilla Firefox 1.0.2
- Mozilla Thunderbird 1.0.2
- MSN Messenger 6.2
- Opera 7.54 with Java
- Portable Firefox 1.0
- Remote Administrator
- SpamPal 1.588
- Sygate Personal Firewall 5.6
- Trillian Basic 3.1
- ZoneAlarm

Patches/Updates
- Ad-aware reference file
- ATI Catalyst 5.3 driver suite (2000/XP)
- ATI Catalyst 5.3 driver suite (98/ME)
- AWG Free Edition Updates
- DirectX 9.0c
- McAfee VirusScan 5.x and 6.x DAT file
- McAfee VirusScan SuperDAT file
- Norton AntiVirus definitions update
- NVIDIA Forceware drivers (2000/XP)
- NVIDIA Forceware drivers (95/98/ME)
- Spybot Search & Destroy Update
- VIA Hyperion 4in1 drivers

Games
- Trackmania: Sunrise

Ozmusicweed
- Featured artist – Function

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Make sure to include your name and postal address on the back of the package so that we know where to send the replacements.

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NEXT MONTH...

BUDGET PCs

Don't be fooled into thinking budget PCs are just for writing emails. Not only are these babies excellent foundations to upgrade from, but they aren't too shabby doubling up as a business system or a second PC. We look at the latest systems on the market.

TAX TIME

It's that time of the year again, and the big boys are launching their latest packages on the market. We look at the latest QuickBooks and MYOB accounting packages out there and tell you which one's best for you.

STORAGE

Inside or out, PC storage is booming. This means more choice and better prices for everyone and, let's face it, you can never have enough space. We round up the latest internal and external drives and give you the best advice on where to spend your dollars.

PROJECTORS

Gone are the days when projectors were luxury entertainment – in just a year prices have plummeted to the cost of an ordinary PC. Next month, the Labs team looks at the projectors for the home and business.

PC AUTHORITY SHOPPER'S INDEX

Also Technology 18
Altech Computers 43
AMI Computers 103
ASUS 37
ATI 26
Blue Chip Infotech 69
BCN Technology 17
Broadband Phone 83
Canon 158
Casio Shriro 66
Creative labs 100
D-Link 45
ECS 91
Emagen 123
Engin 107
Epson 157
Gigabyte 49
Hallmark Computer International 133
Hitachi Global Storage International 114
HP 2,3,4,5
Impact Systems 6,7
In Focus 126
Joytech 153
Kingmax 50
Leadtek 40
MCT 130
Modtech 65
My Net Fone 65
Netgear 62
OZ VOIP 114
Photo Imaging Council Australia 145
Pioneer Computers 25
Protac 39,76
Rectron 99
Region 4 79
Seagate 31
Scorpion Technology 146
Shuttle 32
Smartyhost 119
Swann Communications 93
Synnex 46
Ulead 75
Universal Enterprises 94
Viewsonic 10

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